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ENDOGENOUS WAGE RIGIDITY

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We use a stratified random survey of human resource managers in Sweden, amended with matched data on worker-firm characteristics, to study the reasons for wage rigidity. Our main findings are as follows. First, during the severe recession of the 1990s only 1.1 percent of workers received a wage cut. Second, much wage rigidity can be traced to behavioral mechanisms involving negative reciprocity, relative wage comparisons and money illusion. Third, the reasons for wage rigidity differ significantly between large and small firms, and between the high- and low-end of the labor market. Fourth, there are interaction effects between efficiency wage mechanisms and bargaining mechanisms, and between the strictness of job protection and worker bargaining strength. Fifth, external pay comparisons are a more important reason for wage rigidity in highly unionized firms. Sixth, some evidence suggests that female employees are more loyal, and less aggressive wage bargainers.

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The issue of why wages appear rigid in spite of high unemployment is central to macroeconomics. It is also a key ingredient in discussions about the appropriate stance of fiscal and monetary policy, the need for labor market reform, etc. Despite the important issues at stake there is still little agreement on the empirical relevance of the models proposed in the theoretical literature. As a potential remedy a new literature uses surveys of those who set wages to discriminate between mechanisms.¹ Many wage setters seem to agree that much rigidity can be traced to endogenous mechanisms, unrelated to government regulation and union power. Many wage setters also attribute a primary role to factors like fairness, work moral and money illusion. This consensus among compensation executives and wage negotiators has been viewed as an indication that macroeconomic theory ought to be reformulated along behavioral lines, see e.g. Howitt (2002).

Though the burgeoning survey literature provides useful insights, it is necessarily subject to methodological problems. Some studies cover very few firms (Kaufman (1984) and Blinder and Choi (1990)), or focus on narrowly defined sectors (Agell and Lundborg (1995, 2003)). Most studies focus on large firms.² No study uses random sampling; in the most elaborate survey Bewley (1999) started by asking friends and colleagues for persons to interview. Since response rates are low non-response bias is an important issue. Finally, because of a lack of background data previous surveys have not been able to go very far in exploring causal mechanisms.

This paper addresses these issues. In cooperation with *Statistics Sweden* we have completed a representative survey of human resource managers. Our survey provides a balanced coverage of sectors of particular interest for students of wage rigidity, and we include a large number of firms in all size categories. We have a high response rate, and analysis reported below indicates that non-response bias is a negligible issue. Via *Statistics Sweden* we have rich background information about responding firms and the human capital and demographics of their workers; this

¹ See Kaufman (1984), Blinder and Choi (1990), Levine (1993), Agell and Lundborg (1995, 2003), Bewley (1995, 1999) and Campbell and Kamlani (1997).

² The mean number of employees for the 19 firms interviewed by Blinder and Choi (1990) was 5767. The mean number of employees in the survey of Agell and Lundborg (1995) was 1154. Bewley (1999) oversampled large companies, and interviewed the smallest firms only by accident. The sub-sample of 73 smaller firms surveyed by Campbell and Kamlani (1997) refers to firms with less than 1000 employees that were situated in a certain geographical area, and had a connection to the authors or to Colgate University. Kaufman (1984) focuses on small firms, but his 26 firms were not drawn at random, and they were concentrated to certain geographical areas. Levine's (1993) sample consists of 139 compensation managers in the largest US companies.

allows us to probe deeper in identifying causal mechanisms. Finally, the severe Swedish recession of the 1990s provides a better opportunity to analyze high-unemployment/low-inflation behavior than is possible in surveys for other countries. Between 1991-93 unemployment (inclusive of labor market programs) increased from 4 to 13 percent.³ When we conducted our survey in 1999 unemployment was still ten percent. Inflation was very close to zero, and in the preceding five-year period average inflation was one percent, with little variation between years.

Our main results are as follows. First, during the recession of the 1990s only 1.1 percent of workers received a wage cut. Second, much wage rigidity can be traced to behavioral mechanisms involving negative reciprocity, relative wage comparisons and money illusion. Third, the reasons for wage rigidity differ significantly between large and small firms, and between the high- and low-end of the labor market. Fourth, there are strong empirical complementarities between efficiency wage mechanisms and bargaining mechanisms, and between the strictness of job protection and worker bargaining strength. Fifth, external pay comparisons are a more important reason for wage rigidity in highly unionized firms. Sixth, we present evidence suggesting that female employees are more loyal, and less aggressive wage bargainers.

The next section introduces our survey design, and our method of statistical analysis. Section II documents the pervasive nature of wage rigidity in Sweden, and Section III turns to the role of country-specific institutions in generating rigidity. Section IV contains our main investigation into the sources of endogenous wage rigidity. Section V presents our evidence on gender effects. A final section sums up.

I. Preliminaries

A. Sample and survey design

Our sampling frame is the Business Register of *Statistics Sweden*, which includes the addresses to all enterprises – whether public or private – that carry out (legal) activity in Sweden. In 1999 the register contained addresses to almost 800,000 independent enterprises, and to the 877,768 geographically separated local units where they conducted their activities. As we wanted to explore wage setting at the level of the

³ During the first half of the 1990s the rate of job destruction was quite high in all sectors. According to the Labor Force Survey of *Statistics Sweden*, the number of employees decreased by 24 percent in manufacturing, by 19 percent in public administration, and by 16 percent in unskilled services (hotel and restaurants). For a discussion of the recession of the 1990s, see Lindbeck (1997).

individual plant, and as officials at the head office of a large company might know less about pay at the local level, we chose the local unit as our sampling unit.

In our sampling frame we included sectors that provided sufficient variation to shed light on arguments put forth in the literature, and for this reason we confined attention to four sectors. *Manufacturing* has been at the center of attraction in much previous research. *Skilled services* (consultants, law firms, etc) is of interest because it represents a segment of the labor market with complicated jobs, and where models of work-life incentives and tournaments might be of particular relevance. *Unskilled services* (hotels and restaurants) is a sector with simple jobs, and in the absence of unions and government regulations the forces of demand and supply ought to matter a lot. Since we also wanted to pay attention to differences between profit maximizing units and those that operate under other constraints we also included *public sector administration*. Another consideration was how to deal with the smallest units, where employees and employers often are close relatives. Because standard models of wage setting are less applicable for such firms we excluded all units with less than five employees. After these exclusions, we were left with 29,782 local units, divided among four sectors, and employing 1.141 million people (i.e. 28 percent of total Swedish employment). After dividing the remaining units in three size categories, we obtained the twelve strata of Table A1 in the Appendix. Cost considerations limited our sample to 1200 units, and we assigned a random sample of 100 to each stratum.⁴

The Appendix contains an English translation of our questionnaire. All questions are closed ones, and we asked respondents to indicate their replies on an ordinal scale, with four or five options. An accompanying letter promised that respondents' anonymity would be preserved, and we asked for the cooperation from the human resource manager/someone with corresponding functions. Some previous surveys asked respondents to react to a selection of theories of wage rigidity, see e.g. Blinder and Choi (1990) and Campbell and Kamlani (1997). But most of our questions concern quite concrete issues of work and pay, and we emphasized that we were interested in understanding practices at the respondent's own unit. Like Bewley

⁴ As shown in Table A1 our net samples deviate somewhat from this simple allocation because some units ceased operation between the time our sample was drawn and our questionnaire was put in the mail. Also, since the total population of unskilled service units in the largest size category consisted of only 50 units, we reallocated 50 random drawings to the stratum consisting of small, manufacturing units. Sampling texts often suggest that sample size should be proportional to the number of units in each stratum. But in our case an application of this principle implies that a very large share of the

(1999) we tried to avoid hypothetical questions, and questions that required respondents to assess the general equilibrium implications of firm-level wage setting.⁵

Our questionnaire was sent out in March 1999. After three written reminders, we obtained 885 useable replies, including answers from 300 firms with less than 20 employees. This implies a very high response rate of 75.1 percent. Provided that non-responders would have answered in the same way as the late responders, who replied only after one or more reminders, we can quantify the potential magnitude of the non-response bias. As shown in the Appendix non-response bias does not appear to be an issue: the responses of late responders do not differ significantly from those of the immediate responders, and the percentage of non-response is in fact quite low.

B. Our statistical analysis

Our information about responding units comes from three sources. First, the business register contains information about the geographical location of the unit, its legal status, sectoral classification, and number of employees. Second, our survey asked about union density, pay systems and employment contracts. Third, via their administrative registers *Statistics Sweden* provided us with data on the characteristics of the employees of responding units. Thus, for all but a handful of firms we have detailed demographic, educational and economic information about employees.

To exploit this information we estimate ordered logit models, where we regress the answers to our questions on the regressors shown in Table 1. Many of these variables (like age, measures of education, sex composition, foreign status, etc) might appear in an ordinary earnings-equation, but some are included because they should be of special interest for students of wage rigidity. The first is the number of employees per unit. Large units may find it more difficult to monitor workers (see e.g. Calvo and Wellisz (1978)), and wage rigidity may then be associated with size because shirking is a bigger issue in large units. Alternatively, to the extent that larger units are more sensitive to work disruptions, worker bargaining power may be greater

sample ought to be allocated to the smallest units. But we would then face an obvious risk of getting less reliable responses from the largest units that may employ several thousand employees.

⁵ We did not always make a distinction between mechanisms generating real and nominal wage rigidity. As argued by Ball and Romer (1990) in the presence of small frictions that make it costly to change nominal prices, the mechanisms that generate real rigidity will also generate nominal rigidity. Also, in an environment of near-zero inflation it is difficult to distinguish between mechanisms generating real and nominal rigidity. Finally, as noted by Campbell and Kamlani (1997, p. 764), the

in larger units. We also include the share of employees that belongs to a union, and the share of employees on a permanent employment contract. The idea behind the latter is that workers' bargaining power ought to be an increasing function of the share of employees with secure jobs.⁶ We use eight dummies to control for sectoral affiliation at the two-digit level. There are two dummies indicating population density (we view these as indicators of the size of the local labor market), and one dummy for units belonging to multi-plant enterprises.

Table 2 shows the results when we regress (average) earnings against our explanatory variables. All coefficients are precisely estimated, and in agreement with the microeconomic wage equations for Sweden reported in Albaek et al. (1998) and Arai (2001). As was the case in these studies there is a positive and highly significant size-earnings effect.⁷ Earnings are negatively correlated with the shares of female and non-Nordic employees. The coefficient on the share of employees on a permanent contract is positive, in line with our conjecture that permanent contracts ought to be correlated with worker bargaining strength and/or firm specific skills. Union density enters with a negative⁸ sign, a result that is consistent with previous microeconomic evidence for Sweden. Arai (2001) finds that workers who belong to a union have lower wages, a result that remains even as he controls for a range of characteristics of firms and workers. Arai reports evidence suggesting that this negative union-wage effect mirrors a self-selection of workers with low ability into unions.

II. The incidence of nominal wage cuts

Swedish macroeconomic events during the 1990s, with a large increase in unemployment and a return of price stability, suggest a climate conducive to downward wage flexibility. We asked respondents whether their unit had cut regular wages "...at any time during the crisis years of the 1990s". Twenty-eight units replied in the affirmative, which implies that 3.2 percent of all units had experienced a regular wage cut. Wage cuts were the least common in the public sector (one unit had cut

distinction between real and nominal wages has little meaning when asking firms why they do not lower wages during a recession, or how the internal wage structure affects effort and morale.

⁶ The share of employees on a permanent contract is probably also correlated with the stock of firm-specific skills. In firms where long-term employment relationships are common, there is a stronger incentive to invest resources in firm-specific skill formation.

⁷ Of course, there are studies for many countries documenting large size-earnings differentials.

⁸ The point estimate implies that an increase in union density by 10 percentage points lowers average earnings by 1.27 percent.

pay), and the most common in skilled services (12 units had cut pay). Simple *t*-tests reveal that wage-cutting units differ in important respects. First, they are smaller; the average number of employees is 67.6 in the sub-sample of wage cutting units and 97.8 in the sample of non-cutters. Second, they are less unionized; the average unionization rates of the two sub-samples are 52.8 and 71 percent, respectively. Third, they are more prone to run a profit sharing scheme with wide coverage; the average percentages of employees covered by profit sharing are 64.3 and 30.7 percent in the two sub-samples (these numbers are exclusive of public administration).

Many of the units that had cut pay had done so for a mere handful of employees, and only nine units indicated that they had cut pay for a majority of their employees. Seven of these nine units belong in skilled services. Thus, although we cover a period of 5-6 consecutive years of very high unemployment and near-zero inflation, regular wage cuts appear to be very uncommon in Sweden. Moreover, the 28 firms that did cut pay are concentrated to strata that are less important in terms of total employment (small firms in skilled services). Some calculations show that our results imply that 1.1 percent of the 1.14 million workers who belong to our twelve strata received a regular wage cut during the slump of the 1990s (the 95% confidence interval for this estimate is 0.5%-1.7%).⁹ For comparison Agell and Lundborg (2003) find that none of 159 large manufacturing firms had implemented a comprehensive wage cut during the Swedish recession of the 1990s. Ekberg (2002) studies the incidence of wage cuts using establishment-level data. His results for white-collar workers are quite comparable to ours; between 1996-99 1.15 percent of all white-collar workers received a cut in baseline pay.¹⁰

III. Country-specific institutions

There can be no doubt that the low incidence of wage cuts in our sample is partly due to institutions. Swedish labor law does not allow employers to impose unilateral nominal pay cuts. This is so also in a situation when the old wage contract has expired; the old contract prevails until the parties have reached a new agreement. Moreover, many workers have their wages set in a two-tier system, where industry-

⁹ For each unit we computed the number of employees who had experienced a wage cut. To aggregate to the population level, we used each stratum's share of total employment. To compute the confidence interval we generated a bootstrap distribution with 10000 elements; see Agell and Bennismarker (2002).

¹⁰ For blue-collar workers Ekberg finds a much higher incidence of wage cuts, but – as pointed out by Ekberg – this appears to be due to huge measurement and coding errors in the raw data.

level negotiations precede local level negotiations. The (minimum) wage levels specified in the industry-level agreements specify a floor, which must not be undercut by the local wage agreement. As analyzed by Holden (1994, 1998, 2002) these institutional characteristics may create substantial nominal rigidity.

The following pieces of evidence suggest that these institutional features play a role. First, many firms indicate that job protection creates important costs of hirings and firings (see below). This vindicates a key assumption in Holden's (1994, 2002) analysis of labor law as a basic source of wage rigidity. In his model, a wage cut requires a mutual agreement between firm and worker. Furthermore, the firm is not allowed to fire the worker, and offer re-employment at a lower wage (i.e. firing costs are infinitely large). It is these legal features that give workers a strategic advantage when they try to prevent a nominal wage cut. Second, two-tier wage bargaining is the least common in skilled services. Based on this, we would expect the incidence of wage cuts to be significantly higher in this sector, which is indeed the case. Moreover, union density is significantly lower among wage cutting units. Since union density is an indicator of the importance of two-tier bargaining, this is another indication that collective bargaining matters for wage rigidity.

Third, it is instructive to compare our results with those from three countries with other institutions but a similar macroeconomic experience: the USA, Canada and Switzerland. In these countries an employer can dismiss a worker who refuses to take a wage cut, and these countries also underwent recessions during the early 1990s. US unemployment stood at 5.6 percent in 1990, and peaked at 7.5 percent in 1992.¹¹ Bewley (1999) actively sought out firms that had cut pay during the recession in Massachusetts of the early 1990s, and he found that 24 of 235 interviewed businesses (10.2 percent) had reduced the base pay of some or all employees. Canadian unemployment stood at 8.1 percent in 1990, and peaked at 11.4 percent in 1993. Christofides and Stengos (2001) show that out of 2194 union settlements between 1991-94, 3.6 percent (80 contracts) included nominal wage cuts.¹² Swiss unemployment stood at 1.9 percent in 1991, reached 3.8 percent in 1993, and peaked at 4.0 percent in 1997. Fehr and Goette (2000) find – after correcting for measurement errors – that between 2.3 and 6.4 percent of all workers received a wage cut during each year of the recession of the early 1990s.

¹¹ All unemployment rates given in this paragraph are the standardized ones, provided by the OECD.

¹² See also Fortin (1996) and Christofides and Leung (2002).

Because data sources and methodology differ between studies it is not easy to compare wage rigidity across countries. Even so, we conclude that wage rigidity is more complete in Sweden than in the US, Canada and Switzerland. Our finding that 1.1 percent of Swedish workers received a wage cut refers to the incidence during the *complete* time span of the recession, and the Swedish recession appears to have been much more severe than the recessions in the US and Switzerland, and quite comparable to the recession in Canada. We view this as circumstantial evidence that country-specific institutions can lead to substantial downward wage rigidity.

IV. Endogenous wage rigidity

A. Wage competition from the unemployed

Downward rigidity of hiring pay during a recession could be due either to the absence of active wage competition from the unemployed, or to firms' unwillingness to hire underbidders. To quantify the frequency of undercutting, we asked the following:

Does it happen that your workplace is approached by job seekers who offer to work under conditions that are inferior (lower pay, less convenient hours, poorer work environment, etc.) to those you normally offer new employees with corresponding qualifications?

Only 119 units (13.5 percent) indicated that they had encountered underbidders, and the incidence of underbidding was low in all sectors, ranging from 11.4 percent in public administration to 19.4 percent in unskilled services.¹³

Though this result appears consistent with Solow's (1990) conjecture that there is a social norm that keeps the unemployed from underbidding, it is perhaps even more striking to note that 89.6 percent of firms who had encountered underbidders rejected the offer. Judged against this rejection rate, the low incidence of underbidding during the recession is not surprising – offering to work for little pay is not a successful strategy. Bewley (1999) reports that 30 out of 38 responding employers indicated that they refused low wage offers, and Agell and Lundborg (1995) find the same tendency in their survey of large manufacturing companies.

¹³ For comparison, Bewley (1999) found that 37 of 65 responding firms (57 percent) responded affirmatively to the question of whether “job candidates ever tried to secure jobs by offering to work for little pay.”

Here, we find that rejection of underbidders is a general phenomenon, pertaining to firms in very different sectors, and different size categories.¹⁴

We asked respondents to rank the reasons for rejection; see Table 3. In manufacturing and skilled services, concerns over personnel policy and internal conflict were ranked as the most important factors; i.e. factors emphasized in some efficiency wage models, and in some insider-outsider models. In public administration unions and collective bargaining contracts were ranked as the most important factors (since union density exceeds 90 percent in this sector this is what one might expect). We conclude that understanding wage rigidity at the hiring margin requires that the searchlight be aimed at the firm and its incumbent employees, rather than at the job seeker. In this context it should be noted that less than five percent of managers who rejected underbidders pointed to the explanation “underbidders have inferior skills”.

B. Wages, monitoring, and negative reciprocity

A basic issue in models of motivation is whether firms can appraise work effort. For example, the shirking model of Shapiro and Stiglitz (1984) assumes that workers try to take advantage of the fact that the firm cannot perfectly monitor effort. When we asked, “to what extent can you evaluate whether a specific employee performs satisfactorily on the job?” 50.7 percent of respondents indicated that they could evaluate performance “to a very great extent”, while 49.3 percent indicated that they were less than certain about performance.

Most efficiency wage models predict that changes in external wages (or the outside option) have an impact on work effort. This is true of the shirking model, but it also applies for those versions of the gift-exchange model of Akerlof (1982) in which workers’ norms of comparison extend to workers in other firms. To assess the relevance of these models we simply asked: “How do you think that the work effort of your employees would be affected if wages/salaries increased in comparable companies or organizations, but stayed the same at your unit?” Figure 1 shows that a

¹⁴ The rejection rates range from 97 percent in manufacturing to 82.1 percent in public administration. The rejection rate for units with less than 20 employees is 90.2 percent, and for units with more than 200 employees it is 86.7 percent. These rejection rates coincide with experimental evidence. Fehr and Falk (1999) study a gift exchange game between firms and workers. Both workers and firms may present bids and counter-bids, and firms are not allowed to condition the wage on effort. In anticipation of a reciprocal effort bonus firms typically offered wages that were substantially above the market-clearing level, and they refused to hire workers who offered to work for low pay. Unlike our empirical

great majority (581 out of 882 respondents) thought that higher external wages would lower effort at their own unit. We view this as an indication that many managers perceive a strong incentive to maintain external wage relativities. This result is consistent with Keynes's (1936, p. 14) view of wage rigidity as a coordination failure in an economy where workers care about relative pay; below, we return to this issue.

A recent experimental literature suggests that negative reciprocity is an important motivational factor, and that the risk that disgruntled workers will retaliate by reducing effort makes firms unwilling to cut pay despite high unemployment, see e.g. Fehr, Kirchsteiger and Riedl (1993), Fehr and Gächter (2000) and Gächter and Falk (2002). We asked a question that tried to capture the essence of negative reciprocity: "In your opinion, do those of your employees who are dissatisfied with their pay normally reduce effort?" Forty-nine percent of our respondents (427 managers) answered in the affirmative, 28.9 percent answered that such a response was possible but not common, while 22.1 percent ruled out the possibility altogether.

Table 4 presents our analysis of the determinants of monitoring ability, effort and negative reciprocity. We regress the relevant response variable against the full set of regressors of Table 1. The coefficient on firm size is significant and estimated with very high precision in all columns. Managers in large organizations appear (i) less able to appraise work performance (column 1), (ii) more likely to identify a negative link between effort and external pay (column 2), and (iii) more likely to indicate that negative reciprocity is an important issue (column 4). In a previous version of this paper, we show that these size effects are robust, surviving an extended sensitivity analysis.¹⁵ Few other regressors are statistically significant. Local unions might interfere with management's monitoring strategy, and educated workers hold more complicated jobs, but neither our union measure nor the share of employees with university education are statistically significant in column 1. In the benchmark reciprocity regression (column 4), however, the share of female employees enters with a negative and statistically significant coefficient (p -value $< .01$). Managers with a large share of female employees appear less inclined to believe that disgruntled workers reduce effort. Section V below studies this result in greater detail.

evidence, however, Fehr and Falk report that unemployed workers did engage in considerable underbidding, in spite of very high rejection rates.

¹⁵ Due to space constraints we refer to Table 10 in Agell and Benmarker (2002).

Our finding that negative reciprocity and outside wages play a greater role in large units is consistent with the result shown in Table 2 that employees in large firms have higher average earnings. It is also consistent with our finding that wage cuts were the least common among large units. How could one explain our finding? To the extent that monitoring difficulties increase with plant size the shirking model would lead us to believe that effort in larger units is more responsive to external pay. We would also expect large units to find it more difficult to prevent acts of negative reciprocity. However, a specification test suggests that this explanation is too simple. If the size effect in columns 2 and 4 primarily capture the inferior monitoring capacity of large units it would not remain significant if we add direct measures of monitoring capacity to the estimating equation. In column 3 we add managers' assessment of their ability to appraise work performance to the equation dealing with the link between effort and external pay, and in column 5 we make the same addition to the equation dealing with negative reciprocity. In these alternative specifications the coefficient on our monitoring variable has the predicted negative sign (in column 3 the coefficient is even marginally significant). But the coefficient on the size variable remains significant at the one-percent level in both columns 3 and 5. We conclude that our finding that external pay and reciprocity matter more for effort in larger units is not primarily due to the insufficient monitoring capacity of larger organizations.

We obtained additional evidence against a shirking interpretation of the size effect when we asked managers to what extent they relied on various incentive devices discussed in the literature (see Questions 9a-d in questionnaire). Few managers thought of monitoring and supervision as an important motivational tool, and these attitudes did not differ between managers in large and small firms. Among all managers only 15 percent indicated that they relied on monitoring and supervision to a great or fairly great extent,¹⁶ and when we estimated an ordered logit model using the answers to Question 9a as our independent variable the coefficient on our size variable was very close to zero, and quite imprecisely estimated (p -value = .414).

¹⁶ The situation was somewhat different in the unskilled service sector, where 27.9 percent of managers indicated that supervision and monitoring was used to a great or fairly great extent. Managers in all sectors ranked measures to promote good management-worker relations as the most important motivational device. Many respondents in skilled services pointed to the importance of career ladders, a device that plays a key role in theories of tournaments and work-life incentives. Campbell and Kamlani (1997) present similar evidence against the shirking model, and Bewley (1999, p. 110) reports that "most managers insisted that the theory did not describe their own behavior, but rather a bad form of management." Like us (see below), Bewley reports some evidence that the shirking theory may apply at the bottom end of the labor market.

Summarizing, two-thirds of our respondents believe that an increase in outside wages damages performance at their workplace, and almost fifty percent indicate that negative reciprocity is an important issue. We view this as evidence that endogenous wage rigidity plays an important role also in a labor market where union density is high and government regulation widespread. We have also identified a robust size effect, suggesting that these mechanisms are of greater importance in larger units. Finally, we have presented evidence that casts doubt on differences in monitoring capacity between large and small units as the reason for this effect.

C. Wages and voluntary turnover

A potentially important deterrent to wage cuts is the risk that dissatisfied employees chose the exit option, quits. We asked, “In your opinion, do those of your employees who are dissatisfied with their pay normally seek employment elsewhere?”. Out of 880 responding managers, 58.5 percent replied in the affirmative, 29.4 percent indicated that voluntary turnover was possible but uncommon, while 12.1 percent ruled out this possibility altogether. It appears that many managers view the risk of voluntary turnover as an important constraint on their wage policy.

Table 5 shows our analysis of voluntary turnover. The positive coefficient on the share of employees with university education indicates that the risk of quits is greater in units with a large share of highly educated employees. The negative coefficient on the share of workers on a permanent contract is consistent with the idea that tenured employees can be expected to have built up a greater stock of match-specific human capital. The negative coefficient on the dummy indicating that the firm is situated in an area with a small local labor market suggests that workers’ willingness to vote with their feet depend on opportunities offered elsewhere. The negative coefficient on the union variable suggests that the risk of voluntary turnover is smaller in highly unionized firms. To the extent that unions are successful in extracting rents in the local wage bargain, this is what one might expect.

As a sensitivity check we started with the full set of regressors of Table 1, and then eliminated insignificant variables in a stepwise procedure, starting with the least significant variable. Excluding all variables not significant at the five-percent level, both the share of workers on a permanent contract and our measure of a small local labor market drop out from the final model, but the latter measure is eliminated in the

last round, with p -value = .055. Both the university and union variables are in the final model, with p -value = .000. Employees with much schooling are also better paid. In column 2 we show that there is a positive and statistically significant partial correlation between earnings and the risk of voluntary turnover (since the full set of regressors of Table 1 includes variables that should explain earnings, this regression only controls for sectoral affiliation).

To summarize, a majority of our managers believe that there is a direct link between perceived wage inequity and voluntary labor turnover. We conclude that reducing voluntary labor turnover is an important source of wage rigidity, and that this mechanism is particularly relevant for the high-end of the labor market, where workers are highly educated, lowly unionized and have access to a large local labor market. For comparison, Agell and Lundborg (1995) and Campbell and Kamlani (1997) report that reducing voluntary turnover is a more important explanation of wage rigidity for white-collar workers than for blue-collar workers.

D. Benefits and shirking

The shirking model of Shapiro and Stiglitz (1984) predicts that more generous unemployment benefits induce workers to slacken off. We asked: “How do you think that the work effort of your employees would be affected if unemployment benefits were increased?” Though a large majority believed that higher external wages led to lower effort, few respondents thought the same of higher benefits. Among 876 respondents, only 125 (14.3 percent) replied that more generous benefits would induce their employees to reduce effort. But benefits might still play a relatively important role for the low-end of the labor market. While only 8.3 percent of firms in the skilled service sector believed that higher benefits would reduce effort, 28 percent of firms in the unskilled service sector responded the same.

Column 3 of Table 5 shows our analysis of the link between effort and benefits. The coefficients on the share of employees on a permanent contract and the share of employees with only elementary education are significant at the one-percent level. Both measures remain in the final model as we repeat the step-wise elimination test of the previous section. Thus, firms with a large share of employees on temporary contracts, and with a large share of lowly educated workers, are more prone to identify a negative link between benefits and effort. Workers who are lowly educated

are also lowly paid, and column 4 shows that there is a significant negative partial correlation between average earnings and firms' perception that generous benefits are harmful to effort.

Summarizing, we do not find much evidence that benefits create wage rigidity via their impact on shirking and effort. But benefits might play a role for the low-end of the labor market, where workers are lowly educated and temporary contracts more common. Similarly, Bewley (1999) reports that while most managers dismissed the shirking model as irrelevant, some remarked that it might apply to the market for low paid temporary labor. As noted by Bewley (1999, p. 110), this appears contrary to the spirit of the shirking model, since it was originally developed to explain why wages are pushed up above the market clearing-level in the primary labor market.

E. Bargaining, labor law and negative reciprocity

A large class of models links unemployment and wage rigidity to the bargaining power of incumbent workers.¹⁷ An implication of all these models, which differentiates them from e.g. the competitive model and models of efficiency wages, is that workers capture a share of the firm's surplus in the bargain. We asked:

How common is it that your employees (or their union representatives) require wage hikes because of high profits, or high ability to pay, in your firm/organization?

The answers suggest that profits/ability to pay is an important factor in manufacturing and skilled services, and a marginal factor in unskilled services and the public sector. In manufacturing and skilled services 43.5 and 48.2 percent of respondents indicated that workers always/frequently/sometimes require higher wages in times of high profits/ability to pay. In unskilled services and public administration, the corresponding numbers were 20.9 and 17.0 percent, respectively.

We used these answers to create a proxy-variable for the rent sharing, or bargaining strength, of employees. We classified firms on an integer scale from five to one, depending on the importance of profits/ability to pay in the local pay bargain, and used this measure as the left-hand side variable in our ordered logit regressions.¹⁸

¹⁷ In models of efficient bargaining along the lines of McDonald and Solow (1981), where firms are off their labor demand curves, worker bargaining power has no effect on employment.

¹⁸ Our argument is that in a firm where the employer has all the bargaining power workers would never ask for higher wages because of high profits/ability to pay, while the opposite would apply in a firm where employers have little bargaining power. It should be noted that our measure of rent sharing is

Table 6 shows the results. Both firm size and share of employees on a permanent contract appear with the predicted positive sign, are significant at the five-percent level (or more), and survive our step-wise elimination test. The coefficient on the union variable has the expected positive sign, but the standard error is large (p -value = .131). We also identify a significant and robust gender effect (to which we return below): firms with a large share of female employees are less prone to indicate that profits/ability to pay is an important factor in the local wage bargain.

Columns 2-5 examine two additional issues. First, strict employment protection strengthens the bargaining position of incumbent workers, which in turn may influence pay setting and employment, see e.g. Bertola (1999). We asked managers how job security affected the screening of job applicants, and 54 percent indicated that job protection to a “very great” or “great” extent boosted their screening effort. Thirty-eight percent indicated equally strong support for the proposition that job security lowered their propensity to hire people in an economic upturn, and increased the propensity to rely on overtime hours. In columns 2 and 3 we add the responses to these two questions to the estimating equation. The coefficients on both measures are positive, and quite precisely estimated (p -values are .001 and .000), and robust with respect to our step-wise elimination procedure. Respondents indicating that employment law creates important effects are on average more prone to indicate that their employees bargain for higher wages in times of high profits/ability to pay. These correlations fit the predictions from a large class of bargaining models.

Second, Summers (1988) argues that the presence of efficiency wage mechanisms magnify greatly the effects of worker/union bargaining power. In an “...efficiency wage environment, firms that are forced to pay their workers premium wages suffer only second-order losses. In almost any plausible bargaining framework, this makes it easier for workers to extract concessions” (Summers (1988, p. 386)). Our finding that firm size is strongly correlated with our measure of bargaining strength and as well as with indicators of effort and reciprocity (see Section IV.B) appears to corroborate the conjecture of Summers. To further explore this issue we added the responses to our questions on negative reciprocity and voluntary labor turnover to the estimating equations, see columns 4-5. The estimated coefficients on these variables are positive, statistically significant, and robust with respect to the

correlated with earnings; in an OLS earnings equation with sectoral and geographical controls its coefficient is positive, and significant at the one-percent level.

step-wise elimination procedure. Respondents indicating that negative reciprocity and voluntary turnover are important factors also tend to indicate that profits/ability matter a lot in the local pay bargain. Finally, in all the specifications shown in columns 2-5 the coefficients on firm size, share of employees on permanent contract, and share of female employees remain statistically significant.

Summing up, many respondents indicated that wage claims are responsive to profits and ability to pay. This finding is consistent with a main implication of a large class of bargaining models of unemployment and wage rigidity, but it is at odds with the competitive model.¹⁹ We also presented evidence that strict labor law bolsters worker bargaining power, and that there seems to be interaction effects between negative reciprocity and worker bargaining power. The latter possibility is rarely acknowledged in theoretical models; as noted by Summers (1988) efficiency wage models and models of worker-firm bargaining are treated as alternatives to each other.

F. Workers' wage norms, unions, and Keynes's explanation

A classic explanation of wage rigidity is the argument of Keynes (1936, p. 14) that workers care about relative wages. Because of this they oppose money wage cuts, unless wages can be cut in a coordinated manner throughout the economy. If such comparisons are to explain more than a small amount of wage rigidity, they should extend beyond workers in the same firm. Surveys among US managers suggest however that employees mainly pay attention to the *internal* wage structure. Campbell and Kamlani (1997, p. 780) conclude that workers' notion of fair pay depend on own past wages, firm's profits, and wages of other workers in the same firm. Bewley (1998, p. 485) argues that Keynes's relative wage theory is off the mark, since workers in the firms he approached had "...little systematic knowledge of pay rates at other firms".

In sharp contrast to this evidence, most of our respondents indicated that *both* internal and external wages were important norms of comparisons in the local wage bargain (Question 10a-b). Across all strata, 47.3 percent indicated that internal wage comparisons "always" or "frequently" played an important role, and 41.8 percent said the same about external wages. What can explain the greater role of inter-firm wage comparisons in Sweden? Agell and Lundborg (2003) conjecture that unions foster an awareness of relative pay. Bewley (1998, p. 485) describes his non-union firms as

¹⁹ Arai (2001) finds, like us, that rent sharing is an important factor in Swedish wage setting.

“isolated islands”, and he notes that the precision of the information about external pay appears to be higher among workers in unionized firms.

There is substantial variation in our union variable. While mean union density is .7, 404 firms indicate that union density exceeds .9, and 91 firms indicate that union density is below .1. This variation should allow us to identify any union effect on wage norms with some precision. The first two columns of Table 7 present our analysis of the determinants of wage norms. Indeed, union density is positively and significantly correlated with the intensity of both internal (p -value = .018) and external (p -value = .008) wage comparisons. In our step-wise regressions union density stays in the final model, with p -value = .003 in both equations.

Among the other regressors firm size enters with statistically significant coefficients in both columns (these effects survive our step-wise regressions). These correlations, suggesting that wage relativities are a bigger issue in large firms, are in line with our previous finding that efficiency wage mechanisms are more important in large organizations. As suggested by Summers (1988) there is a close conceptual relationship between Keynes’s stress on relative wage comparisons and the importance attributed to external pay and the outside option in many efficiency wage models.²⁰ The coefficient on the share of employees with a university education is positive and significant at the ten percent level in column 2 (p -value = .055). When we eliminate regressors not significant at the five-percent level, our university measure remains in the final model with p -value = .000. This result agrees with Andrews and Henry (1963), who report that interest in external pay increases with the job level, and with Agell and Lundborg (1995), who find that senior white-collar workers pay greater attention to external pay. Finally, the coefficient on the share of female employees is negative and statistically significant in columns 1 and 2. We return to the possible role of gender in affecting norms of comparison in the next section.

We obtained further support for the view that Keynes’s explanation of wage rigidity holds more promise for unionized firms when we asked respondents to assess how well the following coincided with their own experience:

Some researchers argue that the reason why wages seldom fall is that wage relativities might be altered. Employees try to protect their position in the wage hierarchy, and

²⁰ The Spearman rank correlation coefficient between the answers to Question 6b (how does an increase in external pay affect work effort?) and Question 10b (the importance of external pay in the local pay bargain?) is 0.19 (p -value = .000).

they resist wage cuts because they are afraid that they will fall behind other employees, at their own or other units.

Among our respondents 48.5 percent indicated that this mechanism coincided “completely” or “to a great extent” with their own experience.²¹ Column 3 of Table 7 shows that there is a significant partial correlation between the share of employees belonging to a union and respondents’ appreciation of Keynes’s theory. In the step-wise regression, union density remains in the final model, with p -value = .006.

Finally, it is of some interest to note that Keynes’s view on wage rigidity appears to be based on the experience of the UK in the 1920s, when unions played a much more important role than has ever been the case in the USA. Though Keynes’s relative wage explanation for wage rigidity is often traced to *The General Theory* (1936, p. 14), Keynes (1925) is an earlier publication, which discusses British coal-miners resistance to wage cuts in terms of fairness and relative income.

G. Money illusion

Money illusion is often taken to mean that agents have preferences defined over nominal rather than real outcomes. The surveys of popular attitudes of Kahneman, Knetsch, and Thaler (1986) and Shafir, Diamond, and Tversky (1997) suggest that money illusion is an important phenomenon. Similarly, Bewley (1999) observes that many managers were convinced that their employees would consider a nominal wage cut as highly unfair, even as an insult. We asked our wage setters to react to the following scenarios, adapted²² from Kahneman, Knetsch, and Thaler (1986, p. 731):

Scenario 1 (872 respondents). Assume hypothetically that your enterprise is making a small surplus. There is no inflation, and unemployment is high. There are many job seekers applying for a job at your unit. Under these circumstances you decide to propose a pay cut of 5%. How do you think that your employees would find this proposal? (Question 13a.)

²¹ When we asked a similar question about the labor turnover version of the insider-outsider model (see Question 12b in the Appendix), only 14 percent of respondents indicated that this model coincided “completely” or “to a great extent” with their own experience.

²² In the original scenarios of Kahneman et al., the firm cuts pay under scenario 1, and increases wages by less than inflation under scenario 2. Since unilateral wage cuts are not permitted in Sweden, we chose a somewhat different phrasing. Thus, our firm *proposes* a certain wage change, and we then simply asked the respondent to assess “...how your employees would find this proposal”. Our respondents were asked to rate their employees’ reactions to the two scenarios according to the following five alternatives: entirely unacceptable, highly unacceptable, hardly acceptable, acceptable subject to qualifications, and acceptable. To arrive at the results of the main text, we aggregated the three former under “not acceptable”, and the two latter under “acceptable.”

Acceptable 5.7 %

Not acceptable 94.3 %

Scenario 2 (861 respondents). Assume hypothetically that your enterprise is making a small surplus. Inflation is 10% percent, and unemployment is high. There are many job seekers applying for a job at your unit. Under these circumstances you decide to propose a pay increase of only 5%. How do you think that your employees would find this proposal? (Question 13b.)

Acceptable 49.6 %

Not acceptable 50.4 %

Although both scenarios have identical real implications, many managers responded that their employees would find it easier to accept a reduction in real wages that occurs through inflation, than through a nominal pay cut. These results are strikingly similar to those reported by Kahneman, Knetsch, and Thaler (1986). In their telephone survey of randomly selected residents of Toronto and Vancouver, 62 percent indicated that it was “unfair” to cut nominal pay under the circumstances of scenario 1, while only 22 percent thought the same about the five percent pay rise in scenario 2.

It was probably difficult for our managers to come up with well-founded answers to our hypothetical scenarios. Yet, we find it interesting that our professional wage negotiators seem to be as convinced that money illusion is an important phenomenon in the labor market as the student- and laymen-populations that participate in surveys and laboratory experiments. Shafir, Diamond and Tversky (1997) report a range of survey evidence with a bearing on money illusion. Their data was gathered from survey questions asked to people in shopping malls and an airport. They also report evidence from surveys of undergraduate students at Princeton University. Fehr and Tyran (2001) report experimental results on money illusion; subjects were undergraduates at the University of Zurich.

To analyze the determinants of money illusion we estimated a (maximum likelihood) logit model, where the left-hand side variable took the value of 1 or 0 depending on whether the respondent indicated that employees suffered from money illusion. This exercise showed that none of the background variables (including the sectoral dummies) of Table 1 turned up with coefficients that were statistically significant at the five-percent level. The conclusion seems to be that money illusion does not link up with observable demographic and educational characteristics.

V. The role of gender

A large literature analyzes the role of gender in the labor market; see e.g. Altonji and Blank (1999). Our regressions have produced regularities that we have not seen documented in this literature. Managers in units with a large share of female employees are less likely to indicate that disgruntled employees respond by reducing effort (Table 4), and that profits/ability to pay (Table 6) and external wage comparisons (Table 7) play a role in the wage bargain.

One possible explanation for these findings is that the share of female workers simply picks up differences in unmeasured worker characteristics and working conditions. To address this issue Table 8 shows the effect of adding increased controls for the characteristics of firms and workers. The idea is that if the share of female employees mainly picks up differences in unmeasured worker characteristics/working conditions the coefficient on female should become smaller and less statistically significant as we move down the table. The first row shows the univariate Spearman correlation between the relevant questions and share of female employees. Row 2 adds the continuous controls of Table 1, rows 3 and 4 add the one- and two-digit controls for sectoral affiliation, row 5 adds a direct measure of firms' monitoring ability, and row 6 adds information about firms' pay systems.

In columns 1 and 2 we can see that there is a highly significant Spearman correlation between the share of female employees, and the importance of profits/ability to pay and external pay in the local pay bargain. Despite the increased controls in rows 2-6 the coefficients on share of female employees stay approximately unchanged, and the coefficients remain precisely estimated. Column 3 shows that the Spearman correlation between share of female workers and our question on negative reciprocity is small, and not significantly different from zero. The following rows show that this is entirely due to the omission of other covariates. In rows 2-6 the coefficient on the share of female employees is statistically significant at the five- or one-percent levels.

Unless the variation in remaining unmeasured worker/firm characteristics is more important than the variation in measured worker/firm characteristics that we control for in Table 8 the conclusion seems to be that gender might have an independent impact. In our sample firms with a large share of female employees have lower earnings, an effect which survives even as we introduce a range of controls for

sectoral affiliation and worker-firm characteristics, see Table 1. The results reported in this section seem to suggest that part of the explanation might be that:

- Women are less aggressive wage bargainers, in the sense that they pay less attention to external wages and profits/ability to pay.
- Women feel greater loyalty to their employer, in the sense that they are less prone to counter a perceived wage inequity with acts of negative reciprocity.

Though we acknowledge the speculative nature of these conclusions, some other evidence appears to point in a similar direction. Säve-Söderbergh (2002) uses unique data about requested starting salaries, and offered starting salaries, for a sample of almost 4000 Swedish university graduates. Even as she controls for a wide-variety of job- and worker-specific characteristics, there is a residual gender effect, indicating that women request lower salaries than men. Recent experimental studies indicating that men and women exhibit different degrees of “selfishness” include e.g. Eckel and Grossman (1998), who conclude that “...women are less selfish than men when confounding factors are eliminated”, and Dufwenberg and Muren (2002). In the future we believe that specially designed surveys could be used to sort out whether men and women have different attitudes towards monetary incentives, reciprocity, etc.

VI. Conclusions

Though we believe that our statistical design represents a considerable improvement over the important preceding literature, a final disclaimer is in order. Since there are a limited number of questions that can be added to a single survey we focus on a narrow range of issues. We emphasize mechanisms of wage rigidity that operate at the local level, and we have more questions about endogenous sources of wage rigidity than about “exogenous” institutions. Surveys that specifically deal with e.g. legal institutions seem like a useful complement to the present study. However, to fully explore the effects of country-specific institutions it appears that a broader survey design is called for, like sending out the same questionnaire to firms in countries with different institutions.

Table 1. Explanatory variables used in our regression analysis

Panel A: Continuous variables				
Variable	Source	Mean	Std. Dev.	No. of obs
Log(No. of employees)	BR	3.68	1.35	885
Share of employees belonging to a union	Q	0.70	0.32	867
Share of employees on permanent contract	Q	0.85	0.20	879
Share of female employees	ER	0.41	0.25	845
Share of non-Nordic employees	ER	0.07	0.12	845
Average age of employees	ER	39.5	7.2	845
(Average age of employees) ² /100				
Share of employees with only elementary education	ER	0.21	0.18	845
Share of employees with university education	ER	0.33	0.28	845

Panel B: Dummy variables	
Variable	Description
Eight dummy variables indicating sectoral affiliation	Responding units were classified into nine categories based on the SIC-codes: K72; K73; part of K74; D20-21 and 23-27; D28-35; D15-19, 22 and 36-37; H55; L75111-75212, 75231, 75232 and 75300; L75221-75226 and 75233-75250.
Multiunit	Dummy=1 if unit is part of multiunit enterprise
Situated in area with small-sized labor market	Dummy=1 if unit is in area with low population density (<i>Statistics Sweden</i> regional codes H5, H6)
Situated in area with medium-sized labor market	Dummy=1 if unit is in area with average population density (<i>Statistics Sweden</i> regional codes H3, H4)

Notes: In the third column, BR stands for the Business Register of *Statistics Sweden*, Q for the questionnaire, and ER for the Employment Register of *Statistics Sweden*.

Table 2. The validity of our background data: OLS earnings-equations

Explanatory variables	Dependent variable: Log(Average earnings)
Log(No. of employees)	.043 ^a (.009)
Share of employees belonging to a union	-.127 ^a (.043)
Share of employees on permanent contract	.311 ^a (.057)
Share of female employees	-.401 ^a (.054)
Share of non-Nordic employees	-.334 ^a (.101)
Average age of employees	.160 ^a (.013)
(Average age of employees) ²	-.170 ^a (.017)
Share of employees with only elementary education	-.600 ^a (.083)
Share of employees with university education	.447 ^a (.059)
Situated in area with small-sized labor market	-.093 ^b (.038)
Other controls	See Table 1
R^2 (adjusted)	.672
No. of observations	824

Notes: Log(Average earnings) is calculated via the tax registers, included in the Employment register of *Statistics Sweden*. The regression includes the full set of regressors shown in Table 1, plus a constant. Standard errors are shown in parentheses. ^b denotes significance at the five percent level, and ^a at the one percent level.

Table 3. Most important reasons to reject underbidders

Cited reason	Percentage of respondents that rank the reason as most important in explaining why they reject underbidders			
	Manufacturing	Unskilled services	Skilled services	Public administration
Violates firm's personnel policy; creates internal conflicts	41.7	32.6	37.2	29.5
No vacancies	37.0	29.9	42.0	28.5
Violates collective bargaining agreement; unions resist underbidders	18.2	33.0	16.4	42.1
Underbidders have inferior skills	3.1	4.5	4.5	0.0

Notes: The percentages shown in the four columns are based on the replies of 33, 22, 26 and 25 units, respectively.

Table 4. Monitoring ability, external pay, and the outside option

	Can evaluate work performance?	Higher external wages lower effort of your employees?		Do employees who feel underpaid normally reduce effort?	
	(1)	(2)	(3)	(4)	(5)
Log(No. of employees)	-.150 ^b (.061)	.173 ^a (.060)	.167 ^a (.061)	.207 ^a (.055)	.197 ^a (.055)
Share of employees with university education	.293 (.412)	-.147 (.405)	-.141 (.406)	.689 ^c (.378)	.685 ^c (.378)
Share of female employees	-.418 (.374)	-.155 (.368)	-.176 (.369)	-.894 ^a (.342)	-.949 ^a (.344)
Able to evaluate work performance			-.176 (.143)		-.243 ^c (.131)
Other controls	Table 1	Table 1	Table 1	Table 1	Table 1
Pseudo R-squared	.034	.028	.029	.023	.024
No. of obs.	823	822	822	815	814

Notes: In all columns the estimation method is maximum likelihood ordered logit. Standard errors are shown in parentheses. ^c denotes significance at the ten percent level, ^b at the five percent level, and ^a at the one percent level.

Table 5. Voluntary turnover, and the link between benefits and effort

	Do employees who feel underpaid normally seek other jobs?		Higher benefits lower effort of your employees?	
	(1)	(2)	(3)	(4)
Share of employees with only elementary education	.540 (.535)		1.852 ^a (.697)	
Share of employees with university education	1.472 ^a (.385)		-.265 (.551)	
Share of employees belonging to a union	-.929 ^a (.276)		.014 (.381)	
Share of employees on permanent contract	-.726 ^c (.374)		-1.233 ^a (.468)	
Situated in area with small-sized labor market	-.471 ^c (.244)		.357 (.337)	
Log(Average earnings)		.325 ^b (.165)		-.616 ^a (.208)
Other controls	Table 1	Industry dummies of Table 1	Table 1	Industry dummies of Table 1
Pseudo R-squared	.056	.033	.048	.027
No. of obs.	821	841	818	836

Notes: In all columns the estimation method is maximum likelihood ordered logit. Standard errors are shown in parentheses. ^c denotes significance at the ten percent level, ^b at the five percent level, and ^a at the one percent level.

Table 6. Rent sharing, and hiring and firing costs

	Profits/ability to pay play important role in wage bargain				
	(1)	(2)	(3)	(4)	(5)
Log(No. of employees)	.379 ^a (.058)	.379 ^a (.059)	.410 ^a (.060)	.359 ^a (.059)	.379 ^a (.058)
Share of employees belonging to a union	.414 (.275)	.429 (.277)	.414 (.280)	.415 (.276)	.493 ^c (.277)
Share of employees on permanent contract	.932 ^b (.383)	.986 ^b (.386)	.972 ^b (.388)	1.002 ^a (.385)	.988 ^a (.383)
Share of female employees	-1.651 ^a (.357)	-1.654 ^a (.362)	-1.649 ^a (.361)	-1.553 ^a (.360)	-1.589 ^a (.358)
Job protection creates important hiring costs		.204 ^a (.063)			
Job protection induces overtime at the expense of new hirings			.317 ^a (.070)		
Employees who feel underpaid normally reduce effort				.163 ^b (.066)	
Employees who feel underpaid normally seek other jobs					.171 ^b (.069)
Other controls	Table 1	Table 1	Table 1	Table 1	Table 1
Pseudo R-squared	.097	.101	.107	.099	.100
No. of obs.	817	806	805	810	816

Notes: In all columns the estimation method is maximum likelihood ordered logit. Standard errors are shown in parentheses. ^c denotes significance at the ten percent level, ^b at the five percent level, and ^a at the one percent level.

Table 7. Workers' wage norms in the local bargain

	Internal wage structure plays important role in wage bargain (1)	External wages play important role in wage bargain (2)	Keynes's relative wage theory is relevant (3)
Log(No. of employees)	.355 ^a (.057)	.119 ^b (.056)	-.006 (.055)
Share of employees with university education	.306 (.364)	.710 ^c (.369)	.364 (.367)
Share of employees belonging to a union	.633 ^b (.268)	.730 ^a (.274)	.732 ^a (.267)
Share of female employees	-.591 ^c (.341)	-1.228 ^a (.357)	-.552 (.340)
Other controls	Table 1	Table 1	Table 1
Pseudo R-squared	.086	.055	.012
No. of obs.	819	819	797

Notes: In all columns the estimation method is maximum likelihood ordered logit. Standard errors are shown in parentheses. ^c denotes significance at the ten percent level, ^b at the five percent level, and ^a at the one percent level.

Table 8. The influence of share of female employees: stability analysis

Model estimated	Other explanatory variables	Dependent variables		
		Profits/ability to pay play important role in wage bargain (1)	External wages play important role in wage bargain (2)	Do employees who feel underpaid normally reduce effort? (4)
1. Univariate, Spearman correlation	No	-.237 ^a	-.102 ^a	-.015
2. Ordered logit	Table 1, but no controls for sectoral affiliation	-1.859 ^a (.285)	-1.037 ^a (.280)	-.559 ^b (.270)
3. Ordered logit	Table 1, but one-digit controls for industry-affiliation	-1.283 ^a (.315)	-.874 ^a (.313)	-.840 ^a (.305)
4. Ordered logit	Table 1	-1.652 ^a (.357)	-1.228 ^a (.357)	-.894 ^a (.342)
5. Ordered logit	Table 1, and control for monitoring capacity	-1.672 ^a (.359)	-1.217 ^a (.358)	-.949 ^a (.344)
6. Ordered logit	Table 1, controls for monitoring capacity, share of employees on piece rates, share of employees on profit sharing	-1.654 ^a (.361)	-1.173 ^a (.359)	-.834 ^b (.346)

Notes: The dependent variables were constructed from Questions 10b, 10c and 11a. In rows 5 and 6 the extra regressors are taken from the answers to Questions 2b, 2c and 5a on the questionnaire. The table shows the estimates of the coefficient on the share of female employees. Standard errors are shown in parentheses. ^c denotes significance at the ten percent level, ^b at the five percent level, and ^a at the one percent level.

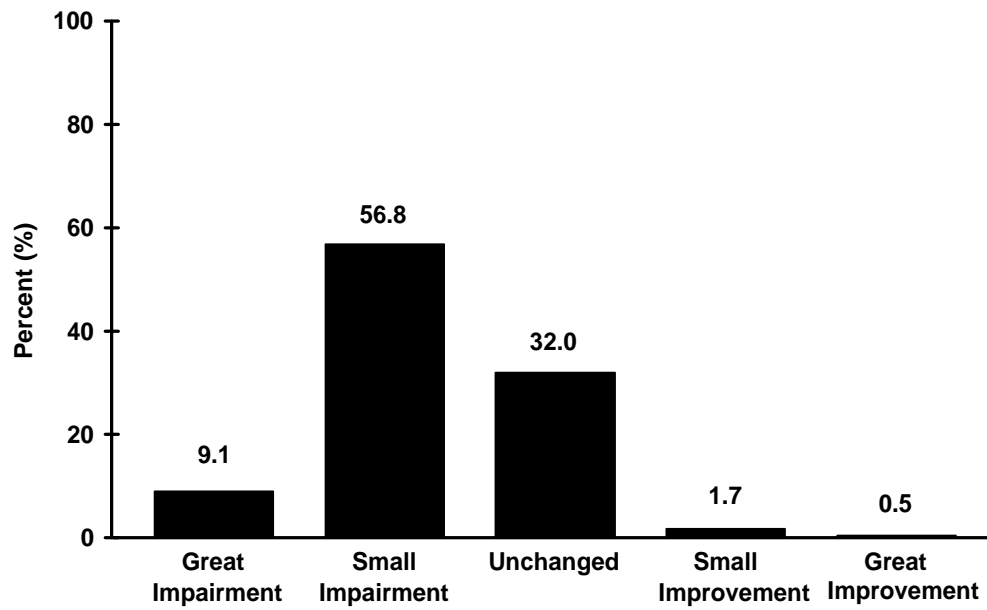


Fig. 1. “How do you think that the work effort of your employees would be affected if wages/salaries increased in comparable firms or organizations, but stayed the same at your unit?” (882 respondents)

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Appendix 1: Analysis of non-response bias

To assess the magnitude of the potential non-response bias we studied how the replies of late responders (i.e. those returning the questionnaire after one or more reminders) related to the replies of those responding immediately. We compared the replies on questions 4a-14c of the questionnaire (26 questions in all) of the 282 late responders with the replies of the 603 immediate responders. According to the Wilcoxon-Mann-Whitney test of shift in location between two populations there were significant differences ($p < 0.05$) in the replies to three out of 26 questions. Late responders were more inclined to choose an alternative indicating little acceptance of the statements in questions 4b and 12a, and to choose an alternative indicating a lesser stigma from long-term unemployment (question 14a).

We next make the assumption that non-responders would have answered questions 4b, 12a and 14a in the same way as the late responders. More precisely, for each of our 12 strata we assumed that non-responders would have answered these questions in exactly the same way as did the late responders. By adding these hypothetical replies of the non-responders to the actual ones we can then obtain a predicted response distribution for the full sample. By comparing this predicted distribution with the actual one, we obtain an estimate of the potential non-response bias.

When we perform this exercise for question 4b, (does protection reduce hirings?) the percentage of respondents choosing alternatives (1, 2, 3, 4) changes from (15.9, 22.2, 33.5, 28.4) to (14.9, 23.0, 34.1, 28.0). For question 12a (does Keynes's relative wage theory describe relevant mechanism?), the percentage of respondents choosing alternatives (1, 2, 3, 4, 5) changes from (10.8, 37.7, 28.3, 10.4, 12.8) to (10.2, 36.0, 28.9, 11.0, 13.9). Finally, for question 14a (how long spell of unemployment is required before there is a stigma from unemployment?) the percentage of respondents choosing alternatives 1-6 changes from (37.5, 5.1, 16.5, 20.5, 5.1, 15.3) to (39.4, 5.2, 16.0, 20.4, 5.0, 14.0).

Based on this standard method of analyzing non-response bias, we conclude that the potential bias is quite small in our survey. The small difference between hypothetical and actual responses reflects two circumstances. First, the responses of late responders do not differ much from those of the immediate responders. Second, the percentage of non-response (24.9%) in our survey is in fact quite low.

Appendix 2: Covering letter and questionnaire

Survey about pay and unemployment

The Institute for Labour Market Policy Evaluation (IFAU) has asked *Statistics Sweden* to conduct a survey about pay setting and causes of unemployment. The questionnaire is distributed to a sample of 1200 firms/organizations with at least five employees.

Purpose of the survey

The purpose of the survey is to provide important information about how the process of pay determination affects unemployment. What are the reasons for wage rigidity? Is wage rigidity a cause of persistent unemployment? Does the institutions of wage setting prevent the unemployed from re-entering the labour market? These are some of the questions researchers want to learn more about. The survey also contains questions on the effects of legislation, wage bargaining, personnel policy, etc.

The questions

The survey is primarily directed at central decision-makers in various types of firms and organizations. We would greatly appreciate your contribution to the research on the reasons for unemployment by responding to the survey. The greatest benefit will be derived if the human resource manager or someone with corresponding experience of personnel policy and pay bargaining answers the survey. To avoid burdening the survey with information that exists in other sources of statistics, the answers will be supplemented with information on responding firms' employment structure from Statistic Sweden's Employment Register.

Confidentiality

The answers to the survey will be treated confidentially and will solely be used for research purposes. When the investigation is complete, the material will be handed over to IFAU in a non-traceable format. All the information we gather is protected by the Official Confidentiality Act, Chapter 9, Paragraph 4. The survey design and questionnaire have been approved by the *Board of Swedish Industry and Commerce for Better Regulation* (Näringslivets nämnd för regelgranskning).

Questions about the survey

Questions about the survey, or about the project, are answered by the project manager: Professor Jonas Agell, Department of Economics, Uppsala University, phone: +46 18 471 1104. You may also contact Agneta Sandqvist at *Statistics Sweden*, phone: +46 19 176027; e-mail: agneta.sandqvist@scb.se.

Please answer the questions and return the survey to *Statistics Sweden* in the enclosed envelope by April 6, 1999. Thank you in advance for your participation.

Sincerely,

Jonas Agell
Professor
Uppsala University

Agneta Sandqvist
Head of Survey Division
Statistics Sweden

1a Have wages (regular hourly wage, monthly salary, piece wage, etc.) been reduced at any time at your workplace during the crisis years of the 1990s?

- 1 Yes
2 No → Go to question 2a

1b What percentage of your staff was affected by the wage reduction?

- 1 0-2%
2 3-4%
3 5-6%
4 7-10%
5 11-20%
6 21-30%
7 31-40%
8 41-50%
9 51-70%
10 71-100%

2a What percentage of your staff belongs to a trade union?

- 1 0-10%
2 11-20%
3 21-30%
4 31-40%
5 41-50%
6 51-60%
7 61-70%
8 71-80%
9 81-90%
10 91-100%

2b What percentage of your staff is covered by some form of profit-sharing system, bonus system, or other system for sharing company profits.

- 1 0-10%
2 11-20%
3 21-30%
4 31-40%
5 41-50%
6 51-60%
7 61-70%
8 71-80%
9 81-90%
10 91-100%

2c What percentage of your staff is covered by some form of piece-rate system.

- 1 0-10%
- 2 11-20%
- 3 21-30%
- 4 31-40%
- 5 41-50%
- 6 51-60%
- 7 61-70%
- 8 71-80%
- 9 81-90%
- 10 91-100%

2d What percentage of your staff has a permanent employment contract?

- 1 0-10%
- 2 11-20%
- 3 21-30%
- 4 31-40%
- 5 41-50%
- 6 51-60%
- 7 61-70%
- 8 71-80%
- 9 81-90%
- 10 91-100%

2e For which of the questions 1b–2d did you make a rough estimate?

Check those questions for which you made a rough estimate

- 1 Question 1b
- 2 Question 2a
- 3 Question 2b
- 4 Question 2c
- 5 Question 2d

3a Does it happen that your workplace is approached by job seekers who offer to work under conditions that are inferior (lower pay, less convenient hours, poorer work environment, etc.) to those you normally offer new employees with corresponding qualifications?

- 1 Yes, frequently
- 2 Yes, occasionally
- 3 Yes, but only seldom
- 4 No, never → Go to question 4a

3b Have any of these individuals been employed under such inferior conditions?

- 1 Yes, most of them → *Go to question 4a*
 2 Yes, some of them → *Go to question 4a*
 3 Yes, but only seldom
 4 No, never

To be answered by those persons who selected alternative 3 or 4 to question 3b

3c Why are these individuals seldom or never employed?

	No sig- nificance	Little sig- nificance	Some sig- nificance	Great sig- nificance	Decisive factor
a The union opposes it	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
b Violation of firm's personnel policy	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
c No vacancies	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
d Laws and collective bargaining agreements prevent it	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
e Creates conflict among employees	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
f Individuals who offer to work under inferior conditions are less productive	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
g Other explanation	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

4a To what extent do the obligations associated with the Employment Security Act (LAS) induce you to make a more thorough review of job applicants' qualifications than would else be the case?

- 1 To a very great extent
 2 To a fairly great extent
 3 To some extent
 4 None at all

4b To what extent do the obligations associated with the Employment Security Act make you more prone to adjust to a business upturn by requiring the current staff to work overtime rather than by hiring new personnel?

- 1 To a very great extent
 2 To a fairly great extent
 3 To some extent
 4 None at all

4c To what extent do the obligations associated with the Employment Security Act induce you to offer flexible, short-term contracts in the form of trial employment, use of personnel from temporary hiring agencies, etc?

- 1 To a very great extent
- 2 To a fairly great extent
- 3 To some extent
- 4 None at all

5a To what extent can you evaluate whether a specific employee performs satisfactorily on the job?

- 1 To a very great extent
- 2 To a fairly great extent
- 3 To some extent
- 4 None at all

5b To what extent can you, where appropriate, evaluate whether a group of employees (e.g. a team, division, project group, etc) performs satisfactorily on the job?

- 1 To a very great extent
- 2 To a fairly great extent
- 3 To some extent
- 4 None at all
- 5 Not applicable

6a How do you think that the work effort of your employees would be affected if there was less unemployment in the region?

- 1 Greatly deteriorate
- 2 Deteriorate somewhat
- 3 No change
- 4 Improve somewhat
- 5 Greatly improve

6b How do you think that the work effort of your employees would be affected if wages/salaries increased in comparable companies or organizations, but stayed the same at your unit?

- 1 Greatly deteriorate
- 2 Deteriorate somewhat
- 3 No change
- 4 Improve somewhat
- 5 Greatly improve

6c How do you think that the work effort of your employees would be affected if unemployment benefits were increased?

- 1 Greatly deteriorate
 2 Deteriorate somewhat
 3 No change
 4 Improve somewhat
 5 Greatly improve

According to some theories, keen competition between employees for salaries and career opportunities will stimulate people to work harder, which is beneficial to the workplace. According to other theories, keen competition between employees results in a poor climate of cooperation, which is detrimental to the workplace.

7 In your opinion, how does (or would) keen competition between employees affect work motivation at your workplace?

- 1 Solely negatively
 2 Both negatively and positively, but mostly negatively
 3 Neither negatively nor positively
 4 Both negatively and positively, but mostly positively
 5 Solely positively

8 Differences in pay among employees can have different effects on work motivation. In your opinion, how do (or would) large pay differentials affect work motivation at your workplace?

- 1 Solely negatively
 2 Both negatively and positively, but mostly negatively
 3 Neither negatively nor positively
 4 Both negatively and positively, but mostly positively
 5 Solely positively

How can one promote employee motivation? Indicate to what extent you apply the following measures.

9a To what extent do you supervise and monitor the work performance of your employees?

- 1 To a very great extent
 2 To a fairly great extent
 3 To some extent
 4 To a very little extent
 5 Not at all

9b To what extent do you establish career tracks, which give able employees the opportunity to qualify for promotion?

- 1 To a very great extent
- 2 To a fairly great extent
- 3 To some extent
- 4 To a very little extent
- 5 Not at all

9c To what extent do you pay wages/salaries that are linked to performance?

- 1 To a very great extent
- 2 To a fairly great extent
- 3 To some extent
- 4 To very little extent
- 5 Not at all

9d To what extent do you try to promote good management-worker relationships (e.g. by creating interesting work-assignments, delegating decision-making, formulating transparent objectives for your activities, etc)?

- 1 To a very great extent
- 2 To a fairly great extent
- 3 To some extent
- 4 To very little extent
- 5 Not at all

10a During pay negotiations, how common is it that your employees (or their union representatives) compare their pay with that of other employees at your own workplace?

- 1 Always
- 2 Frequently
- 3 Sometimes
- 4 Infrequently
- 5 Never

10b During pay negotiations, how common is it that your employees (or their union representatives) compare their pay with that of employees at other workplaces?

- 1 Always
- 2 Frequently
- 3 Sometimes
- 4 Infrequently
- 5 Never

10c How common is it that your employees (or their union representatives) require wage hikes because of high profits, or high ability to pay, in your firm/organization?

- 1 Always
 2 Frequently
 3 Sometimes
 4 Infrequently
 5 Never

11a In your opinion, do those of your employees who are dissatisfied with their pay normally reduce performance?

- 1 Yes, definitely so
 2 Yes, to a great extent
 3 Yes, to some extent
 4 Yes, but only occasionally
 5 No, I do not think so

11b In your opinion, do those of your employees who are dissatisfied with their pay normally seek employment elsewhere?

- 1 Yes, definitely so
 2 Yes, to a great extent
 3 Yes, to some extent
 4 Yes, but only occasionally
 5 No, I do not think so

Below we present some economic theories and a few hypothetical examples that attempt to shed light on why wages/salaries seldom fall in spite of high unemployment.

12a *Some researchers argue that the reason why wages seldom fall is that wage relativities might be altered. Employees try to protect their position in the wage hierarchy, and they resist wage cuts because they are afraid that they will fall behind other employees, at their own or other units.*

To what extent does this explanation agree with your view/experience?

- 1 Complete agreement
 2 To a great extent
 3 To some extent
 4 To very little extent
 5 Does not at all agree with my experience

12b *One theory to explain why wages may end up above the level that gives full employment is based on the notion that hirings and firings are costly to firms. These costs (for interviews, advertisements, training, redundancy payment, etc.) make firms eager to keep already employed workers. By pushing up wages, this situation is exploited by employees.*

To what extent does this explanation agree with your view/experience?

- 1 Complete agreement
- 2 To a great extent
- 3 To some extent
- 4 To very little extent
- 5 Does not at all agree with my experience

13a *Assume hypothetically that your enterprise is making a small surplus. There is no inflation, and unemployment is high. There are many job seekers applying for a job at your unit. Under these circumstances you decide to propose a pay cut of 5%.*

How do you think that your employees would find this proposal?

- 1 Completely unacceptable
- 2 Highly unacceptable
- 3 Hardly acceptable
- 4 Acceptable with great hesitation
- 5 Acceptable

13b *Assume hypothetically that your enterprise is making a small surplus. Inflation is 10% percent, and unemployment is high. There are many job seekers applying for a job at your unit. Under these circumstances you decide to propose a pay increase of only 5%.*

How do you think that your employees would find this proposal?

- 1 Completely unacceptable
- 2 Highly unacceptable
- 3 Hardly acceptable
- 4 Acceptable with great hesitation
- 5 Acceptable

14a **How long time must a person have been unemployed before you consider him/her to be less suitable for a job, in spite of the fact that the person in other respects appears to satisfy all requirements?**

- 1 Has no significance
- 2 More than one month but less than six months
- 3 More than six months but less than one year
- 4 More than one year but less than 18 months
- 5 More than 18 months but less than two years
- 6 Two years or more

14b Assume that a person has alternated between unemployment and participation in a training program for some time. How long time must the person have been in this situation before you consider him/her to be less suitable for a job, in spite of the fact that the person in other respects appears to satisfy all requirements?

- 1 Has no significance
- 2 More than one month but less than six months
- 3 More than six months but less than one year
- 4 More than one year but less than 18 months
- 5 More than 18 months but less than two years
- 6 Two years or more

14c Assume that a person has alternated between unemployment and relief work for some time. How long time must the person have been in this situation before you consider him/her to be less suitable for a job, in spite of the fact that the person in other respects appears to satisfy all requirements?

- 1 Has no significance
- 2 More than one month but less than six months
- 3 More than six months but less than one year
- 4 More than one year but less than 18 months
- 5 More than 18 months but less than two years
- 6 Two years or more

Other comments

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Thank you for your participation!

Table A1. Population, sample, and response rates

Strata	Total no. of local units in stratum	Total employment in stratum	Gross sample	Net sample, after adjusting for overcover.	Useable replies	Response rate
Manufacturing, 5-19 employees	8,745	82,962	150	149	110	73.8
Manufacturing, 20-99 employees	3,998	171,330	100	98	77	78.6
Manufacturing, 100- employees	1,284	426,451	100	99	83	83.8
Unskilled services, 5-19 employees	3,090	27,481	100	98	45	45.9
Unskilled services, 20-99 employees	894	33,959	100	100	63	63.0
Unskilled services, 100- employees	50	8,154	50	49	32	65.3
Skilled services, 5-19 employees	5,906	52,552	100	99	69	69.7
Skilled services, 20-99 employees	1,606	60,851	100	98	74	75.5
Skilled services, 100- employees	232	60,600	100	97	76	78.4
Public administration, 5-19 employees	1,699	18,942	100	96	76	79.2
Public administration, 20-99 employees	1,762	74,960	100	99	88	88.8
Public administration, 100- employees	517	123,132	100	97	92	94.8
Total	29,782	1141,374	1200	1179	885	75.1

Notes: Manufacturing includes the manufacturing sector in its entirety; unskilled services include hotel and restaurant units; skilled services include computer consultants, R&D units, law firms, etc.; public administration includes civilian authorities, and a smaller number of defense units. According to NACE, the industrial classification system of the European Union, manufacturing is group D, unskilled services group H, and Public Administration group L. Skilled services include subgroups K72, K73, and part of K74.