Individuals' Wage Changes in Australia 1997-2000*

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Abstract

This paper examines Australian household data from over 4000 individuals to assess how downwardly flexible nominal wages have been during the period 1997 to 2000. The data indicate that there is considerable downward rigidity. Only 7.4 per cent of workers who are still working the same hours in the same job experienced a cut in pay over the previous year. People in low-income households, unskilled and part-time workers and workers reliant upon the Safety Net (i.e. their wages are determined solely by award) are more likely to have received a pay cut than others.

1. Introduction

The paper provides an overview of individuals' nominal wage changes in Australia from 1997 to 2000. The aim of this paper is to give a broad picture on the flexibility of nominal wages during this very low inflation period by investigating the distribution of individuals' pay changes.

A well functioning neo-classical labour market requires fully flexible relative wages and downwardly flexible real wage rates. Without this flexibility some labour markets will not clear and unemployment will ensue. Real wage flexibility is usually more difficult to achieve during times of low inflation since a real wage cut requires nominal wages to fall, and this can be difficult to achieve without detrimental effects on worker morale and job turnover (Bewley 1998). If nominal wages are downwardly rigid, unemployment and the loss of firm specific human capital become the cost of very low inflation.

Evidence to date on the prevalence of nominal wage flexibility, especially downwards, is ambiguous. A lack of suitable longitudinal data has made such studies almost absent in Australia. An exception is Dwyer and Leong (2000) who examined the Australian Mercer Cullen Egan and Dell (MCED) database of skilled wage rates to find that wages did not exhibit downward flexibility over the period 1992 to 1999. Studies in the US, for example McLaughlin (1994), have found that nominal wage reductions are widespread enough to suggest that wages are fairly flexible. However, Altonji and Devereux (1999), Lebow et al. (1999) and Wilson (1999) find contrary evidence. Kahn (1997) and Card and Hsylop (1997) also conclude that downward nominal wage rigidity exists but has no serious macro economic consequences. Similar findings are reported by Smith (2000) in a study of wage flexibility in the UK. The main causes of the different findings arise from the type of data and assumptions made when examining downward wage rigidity. Household surveys tend to have larger measurement errors than administrative records.

This paper uses representative Australian household micro data from 1997 to 2000 to assess the prevalence of nominal pay cuts and the factors associated with differential rates of pay change. The existence of nominal wage rigidity, in general, would be reflected by significant truncation at zero and asymmetry in the distribution of wage changes. In this paper, three different measures of pay changes are employed. Besides the changes in total pay, which is directly

available in the survey, the distribution of derived changes in hourly pay is also investigated since working hours may be an instrument of adjusting wage rate without changing pay rolls.[1] Moreover, the distribution of changes in total pay for individuals who keep the same working hours is investigated to approximate the distribution of changes in wage rate. Intuitively, changes in wage rate would be the ideal measure to study nominal wage rigidity since it will not be affected by voluntary changes in working hours. However, the distribution of changes in total pay is also of interest because total pay may have stronger psychological impact to individuals than wage rate for those whose wage rates are not clearly defined, such as full-time salary earners.

Further, in order to understand the nature of pay changes, the magnitudes and sources of pay changes are examined against basic demographic and labour market characteristics, including the individual's dominant pay regime (Safety Net[2], enterprise agreement, or individual contract).

We found that only 7.4 per cent of workers, whose working hours remained unchanged, experienced pay cuts and there is a large spike at zero, which implying that some individuals' wage should have fallen instead of remaining the same if the distribution of wage changes follows a normal distribution. This confirms that nominal wages are downwardly rigid to some extent. However, we still cannot determine the extent of nominal rigidity because the data series are not long enough for formal statistical tests. The finding that people in low-income households, unskilled and part-time workers, and workers reliant upon the Safety Net are more likely to have received a pay cut than others implies a correlation between pay cuts and low bargaining power.

The paper is arranged as follows. Section 2 describes the data and discusses the advantages and limitations of the data set. Section 3 explores the distribution of total pay changes and hourly total pay changes. Section 4 discusses the correlation between wage changes and individuals' characteristics. The distribution of sources of total pay changes by demographic and job characteristics are presented in section 5 and a brief conclusion follows in section 6.

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[1] Hourly total pay is considered as a proxy for average unit labour cost, which is different from basic wage rate. See section 2 for further discussion.

[2] Individuals on Safety Net are those whose pay is determined solely by award.

2. Data

The data have been derived from the quarterly Melbourne Institute Wage Survey (MIWS), which interviewed over 14,000 randomly selected householders between August 1997 and May 2000. Only employees who are less than 65 years old and have been in the same job for over a year are included in our wages sub-sample, leaving about 5,400 respondents and a sample of 5,345 observations with a complete set of responses.

The pay changes for individuals who changed their job during the previous 12 months are not available in the survey, so the sample distribution of pay changes may not be representative. We cannot for example exclude the possibility that many pay cuts may occur through job changes. However, including only job stayers avoids the complication of wage changes of job movers due to changes in job characteristics.

The dataset includes information on sources and magnitude of total pay changes, working hours, demographic characteristics and employment contract type. Changes in hourly rate of total pay are not directly available, but can be derived from information on working hours and total pay changes. The hourly rate of total pay is a measure of average unit labour cost for each individual. It can change due to a change in the proportion of overtime hours worked or because of age/experience related increments, different bonus payments and performance loadings. It can also change due to different usual working hours if the change in total pay is not in the same proportion as the change in usual working hours.

The percentage changes in total pay used in this paper are self-reported numbers, and accordingly rounding errors, digit preference[3] or errors caused by poor memory may be larger than data from panel surveys or payroll records. A way to overcome this problem is to group the information on percentage changes in pay into intervals so that the preferred digits and the numbers nearby are in the same category.[4] However, our data do not suffer from attrition

[3] Certain numbers, such as 0, 5, 10 tend to be favoured, probably for psychological reasons or the decimal system. Similar patterns are found in the study of consumer inflationary expectations by Harding and Harris (1998).

[4] The DOGEV model introduced in Fry and Harris (2000) may be employed in a multivariate analysis to solve digit preferencing problem. For the bivariate analysis in this study, categorisation of the pay changes is the preferred solution.

problems common to panel data, nor the lack of demographic information in most administrative data sets.

3. Distribution of wage changes

The distribution of changes in total pay presented in Figure 1 shows that more than 35 per cent of job stayers reported no changes in their total pay over the 12-month period previous to the survey week.[5] This is higher than the figures reported using other data sources in both the US[6] and Australia. In Australia, Dwyer & Leong (2000) have shown that only about 10 per cent of job stayers whose total employee reward remain unchanged.[7] It is still a puzzle why the spike at zero is so large in our sample. Part of differences between the figures from the two different data sets may be attributed to the nonrandomness of the MCED data or the recall errors in our sample.

The normal distribution peaks at around 2 to 3 per cent, which is not surprising under the average annual inflation of around 1 per cent during this period. The proportion of job stayers reporting less than 1 per cent pay rises is much smaller than expected in a smoothed distribution. Lack of frequent small pay changes may reflect either menu costs or individuals ignore small pay changes. It is also possible that pay changes that is smaller than 1 per cent implied real wage cuts in this period, so they happened less frequently. Spikes exist at 5, 10, 15 and 20 per cent which may be driven by individuals' digital preferences or rounding errors.

Eleven per cent of our sample reported pay cuts and most of these cuts were only for less than 1 per cent. Digital preferences can also be observed in the pool of negative pay changes. Interestingly, there is significant truncation of the distribution at -2 but not –1 per cent. There is a reasonably large pool of job stayers who reported small pay cuts but few people have pay cuts above 1 per cent. Since our total pay changes include changes in performance loading, overtime payments, these small amount of changes could be driven by small changes in hours worked,

[5] In order to identify the zero and nonzero pay changes clearly, in the histogram, the bar at zero represent the pay changes that exactly equal zero instead of numbers around zero. The bar at 1 represents observations that have pay changes greater than 0 and less than or equal to1, and -1 represents those less than zero and greater or equal to -1.

[6] 7.66 per cent of job stayers have zero annual pay changes (Kahn 1997).

[7] This is the closest figure to our definition of total pay. Bonus, commission and incentive payments are excluded in the total pay figure reported by Dwyer & Leong (2000).

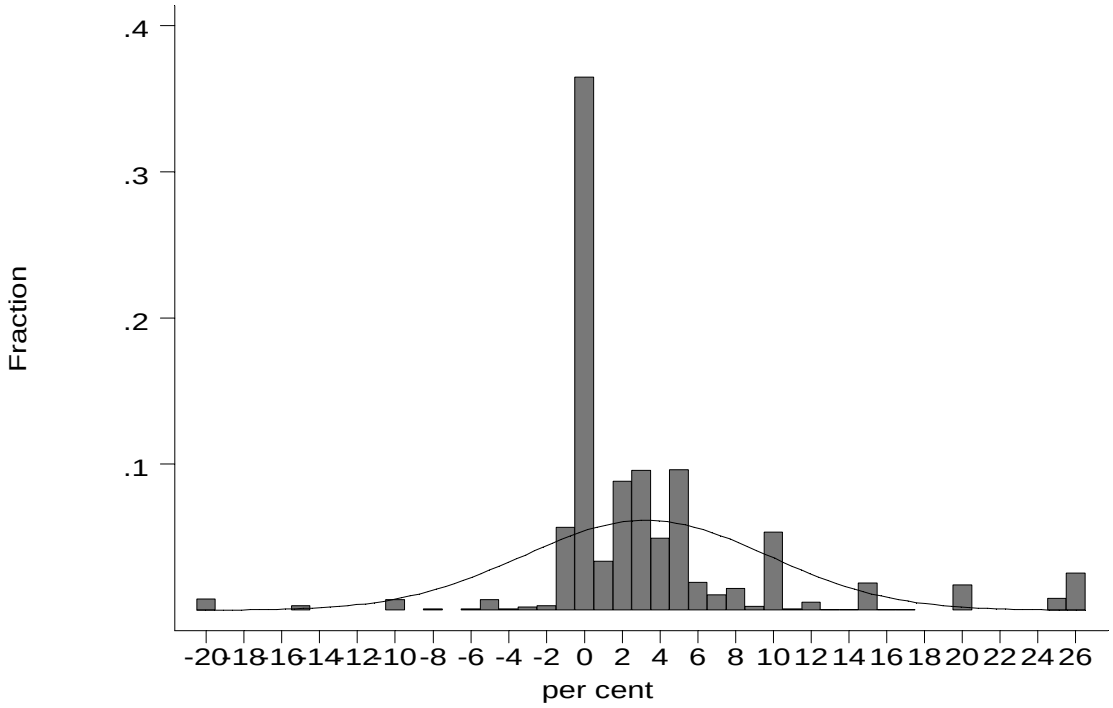
bonus payment or performance loadings, all of which do not have large menu costs associated with them.

Figure 2 looks solely at individuals whose working hours had not changed over the previous 12 months. Pay changes for this sup-sample are considered as proxies for their changes in wage rate for the direct measure are not available in the data set. Nevertheless, the distribution does not exactly represent the distribution for all job stayers. The pattern for Figure 2 is similar to the figure for the whole sample but with a slightly larger proportion of the sample maintaining the same total pay and a smaller proportion of the sample experiencing pay cuts. Only 7.4 per cent of workers received pay cuts. The large spike at zero and small fraction of the sample with pay cuts suggest that there is a discontinuity in the distribution of wage changes. Some individuals who have zero pay changes would have received pay cuts if the pay changes were normally distributed without truncation. That is, to some extent, nominal wages are downwardly rigid.[8] An analysis of the factors underlying downward nominal wage rigidity is beyond the scope of this paper.

The distribution of hourly total pay changes for the whole sample shows a different pattern (see Figure 3). The spike at zero is slightly smaller, but the spike at 1 and -1 are much larger than previous two figures. This reflects that there are many individuals on the same pay with small changes in usual working hours. However, Figure 3 also shows that very few individuals have pay cuts which are larger than 1 per cent.

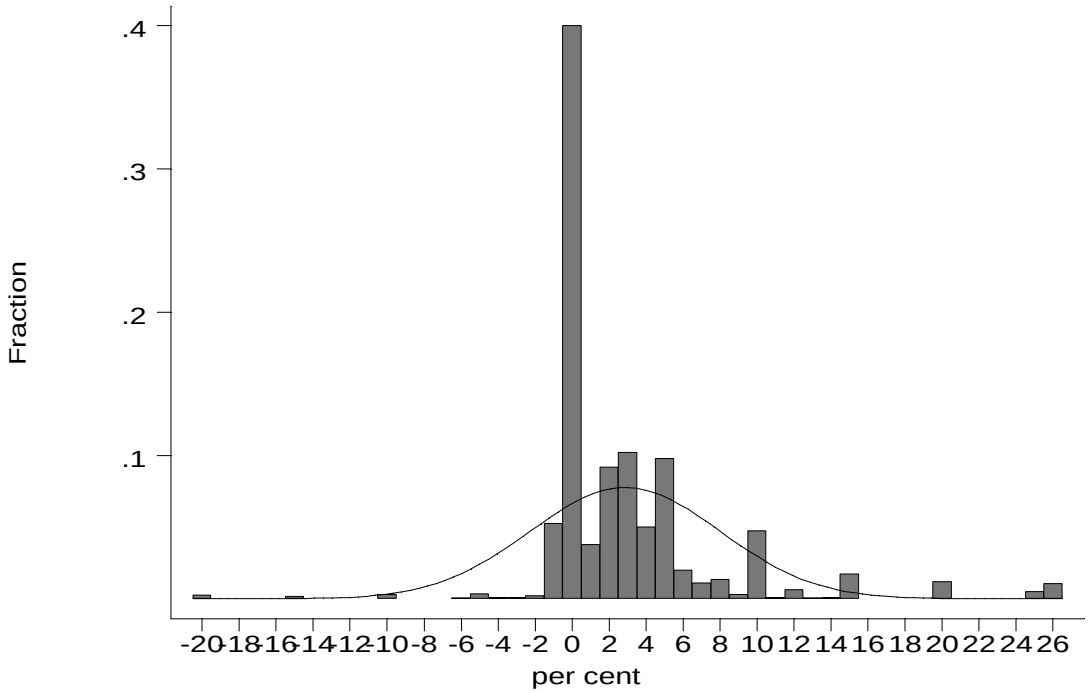
[8] A formal statistical test of nominal wage rigidity relies on the relationship between changes in inflation and the distribution of wage changes. It requires longer series of data which covered different stages of business cycles. Unfortunately, the series of MIWS wage data is not long enough for the statistical test of nominal wage rigidity.

Figure 1 The Distribution of Total Pay Changes (whole sample)



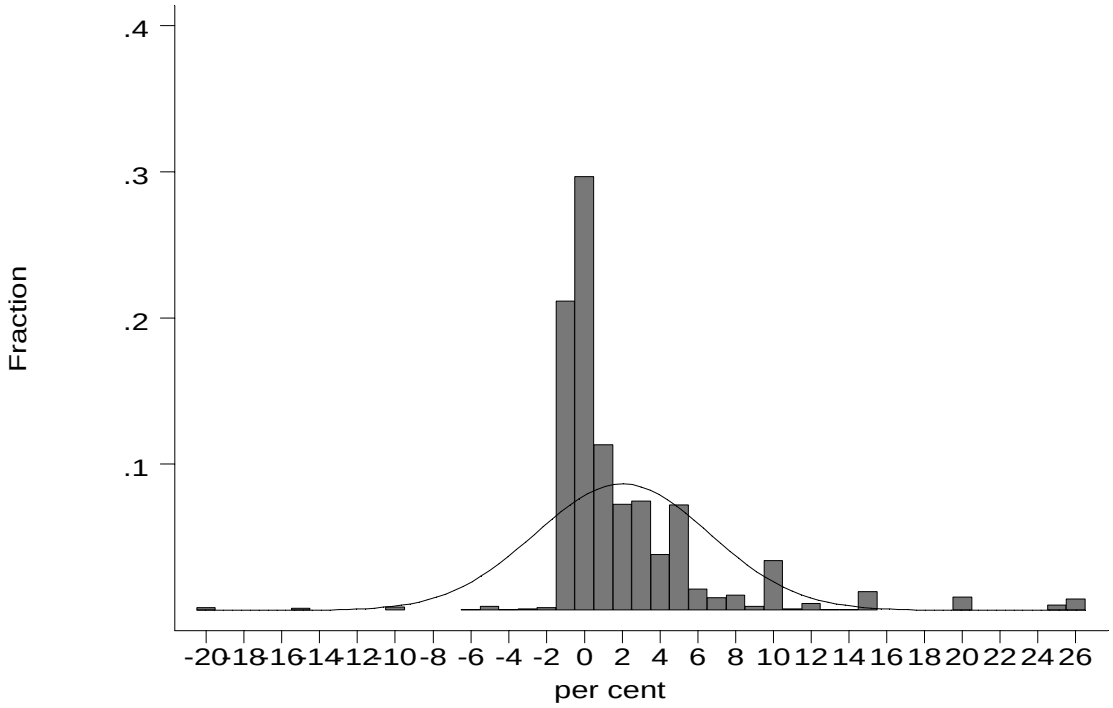
Source: MIWS August 1997–May 2000, N=5345.

Figure 2 The Distribution of Total Pay Changes (same working hours)



Source: MIWS August 1997–May 2000, N=3771.

Figure 3 The Distribution of Hourly Total Pay Changes (whole sample)



Source: MIWS August 1997–May 2000, N=5345.

4. Correlation between wage changes and personal characteristics

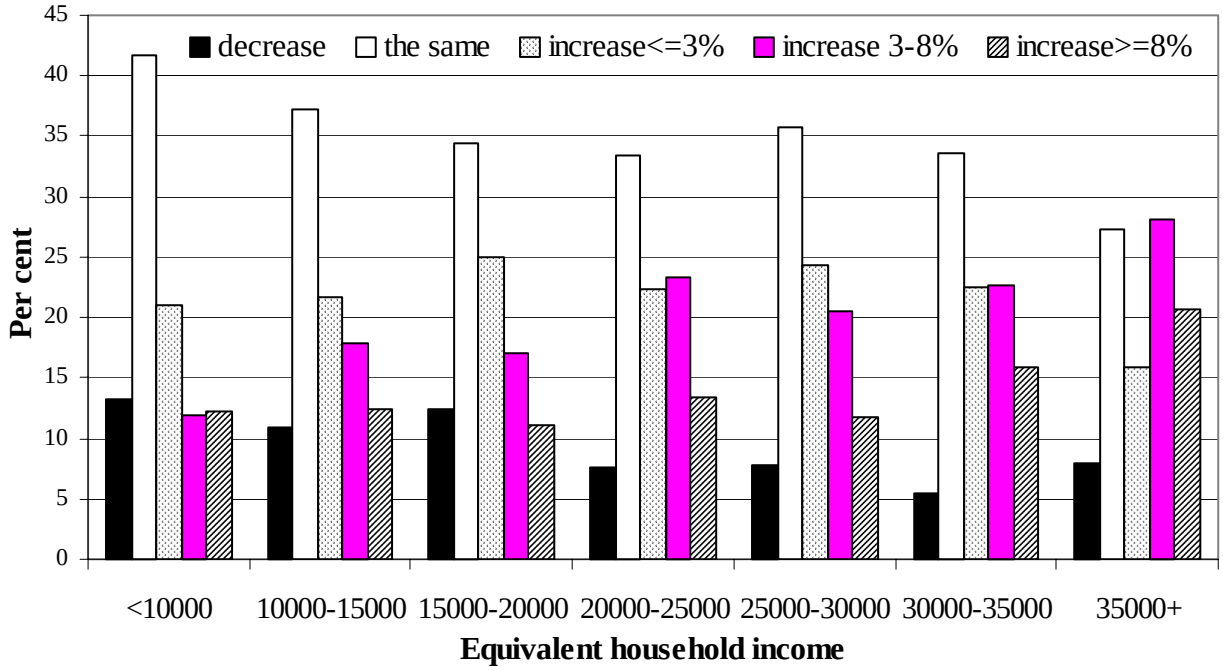
The magnitude of total pay changes is classified into five ranges: decrease, no change, increase less than or equal to 3 per cent, increase between 3 and 8 per cent, and increase more than 8 per cent. In this way the analysis is less likely to be affected by digit preferences and other measurement errors since points near 5 (or 10) are in the same group with 5 (or 10). We have also examined whether there are significant differences in these correlations over time. However, since the data does not vary significantly over time, only figures for the pooled sample are illustrated.

Changes in total pay by household income are presented in Figure 4. Total household income[9] is transformed into equivalent household income by dividing household income by the number of

[9] The information about household income is given in ranges, therefore, midpoint of each range are used in the calculation of equivalent household income.

adult-equivalent[10] people in the household. The percentage reporting pay cuts is higher for the low income group, while individuals in high income groups are more likely to report large pay increases (greater than 3 per cent). This may be because people with low household income have weakest bargaining power. A tight household budget and likely vulnerable labour market position mean that they cannot afford to lose their job, so they are more likely to bear pay cuts rather than change jobs. Since individuals' wages and equivalent household income are correlated, it is also possible that the higher pay increases among high-income groups reflects a positive association between pay increases and pay level.[11]

Figure 4 Total pay changes by equivalent household income



Pearson chi2(28) = 123.4760 Pr = 0.000[12]
Source: MIWS August 1997–May 2000, N=4059.

[10] Income per person=household income /(1+ 0.6*(number of adults-1)+0.3*number of children).

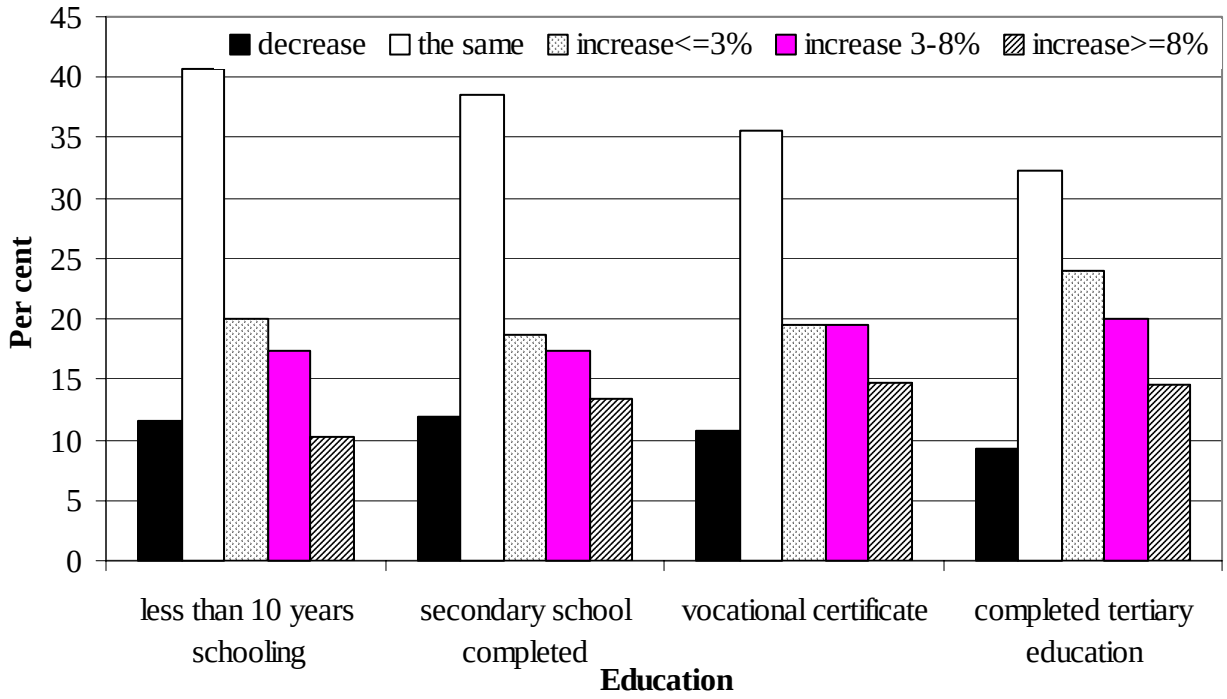
[11] Information on wage levels is not part of this data set. Educational attainment and occupation have been used as proxies for wage level.

[12] Pearson chi-square statistics is the test statistics of the independence of the columns and rows for the correspondent table. A p-value of less than 0.05 shows the probability that the distributions of household income and wage changes are independent is less than 5 per cent.

Figures 5 and 6 present the relationship between pay changes and educational attainment and occupation. Individuals who do not have any post-school qualifications are more likely to have zero changes in total pay or even receive pay cuts. Positive pay changes occur more often among tertiary educated individuals. Since education and occupation are correlated, the figure for pay changes by occupation shows similar but clearer patterns compared with the figure by education level. The proportion of machine operators and labourers who experienced pay cuts is the largest among all occupational categories, while managers and professionals are more likely to receive large pay increases. This supports the hypothesis that white-collar workers are favoured due to recent skilled biased technological change. Since a similar pattern for the different educational levels was found among the sub-sample of individuals who had not changed their hours of work, the graph is not presented here.

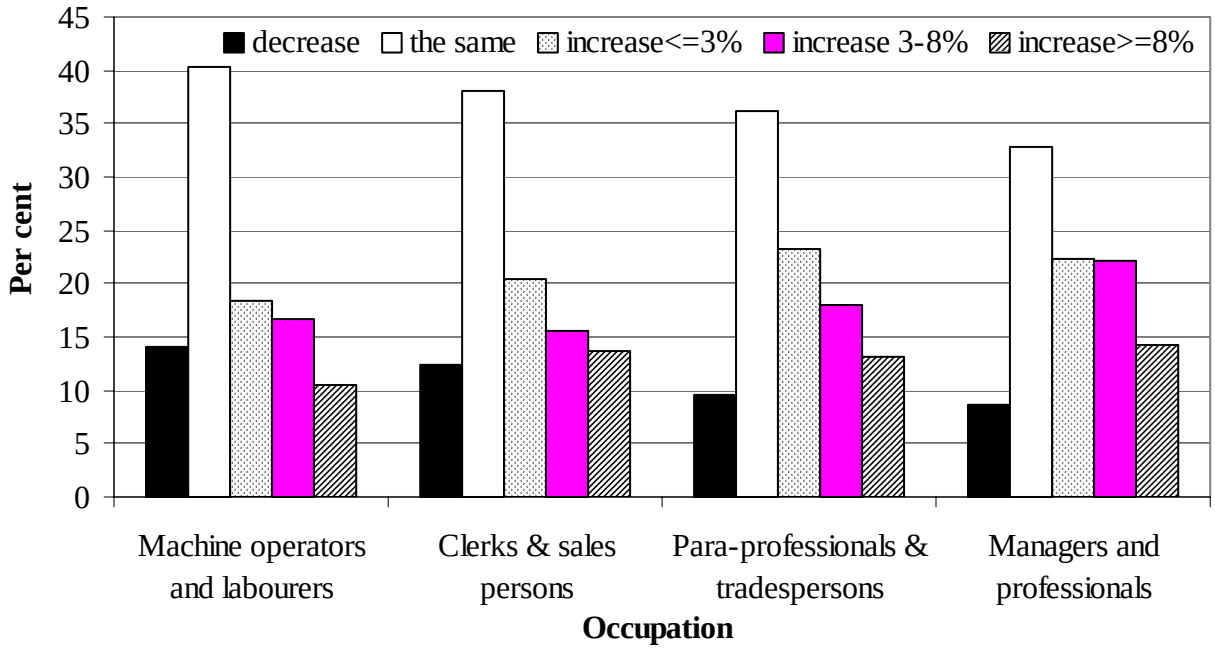
However, the percentage changes in hourly total pay by occupation tell us a different story. As shown in Figure 7, managers and professionals have the largest proportion of workers who experienced a decrease in hourly total pay. This reflects the increasing workloads of managers and professionals. For some managers, their total pay increases are not sufficient to cover the increment of working hours. In terms of the magnitude of the hourly pay increment, managers and professionals have a slightly higher probability of receiving a large (more than three per cent) hourly pay rise than other occupational groups.

Figure 5 Changes in total pay by educational attainment



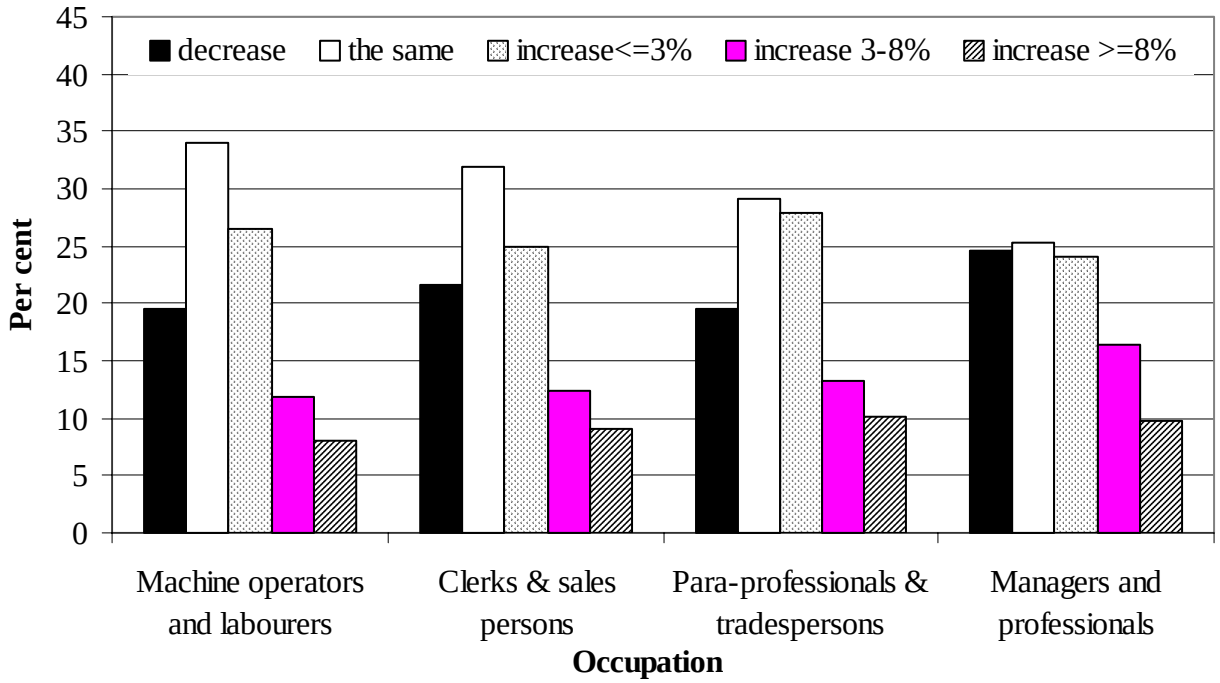
Pearson chi2(12) = 56.3861 Pr = 0.000
Source: MIWS August 1997–May 2000, N=5345.

Figure 6 Total pay changes by occupational group (ASCO 1st)



Pearson chi2(12) = 67.6070 Pr = 0.000
Source: MIWS August 1997–May 2000, N=5345.

Figure 7 Changes in hourly pay by occupational group (ASCO 1st)



Pearson chi2(12) = 51.2570 Pr = 0.000
Source: MIWS August 1997–May 2000, N=5345.

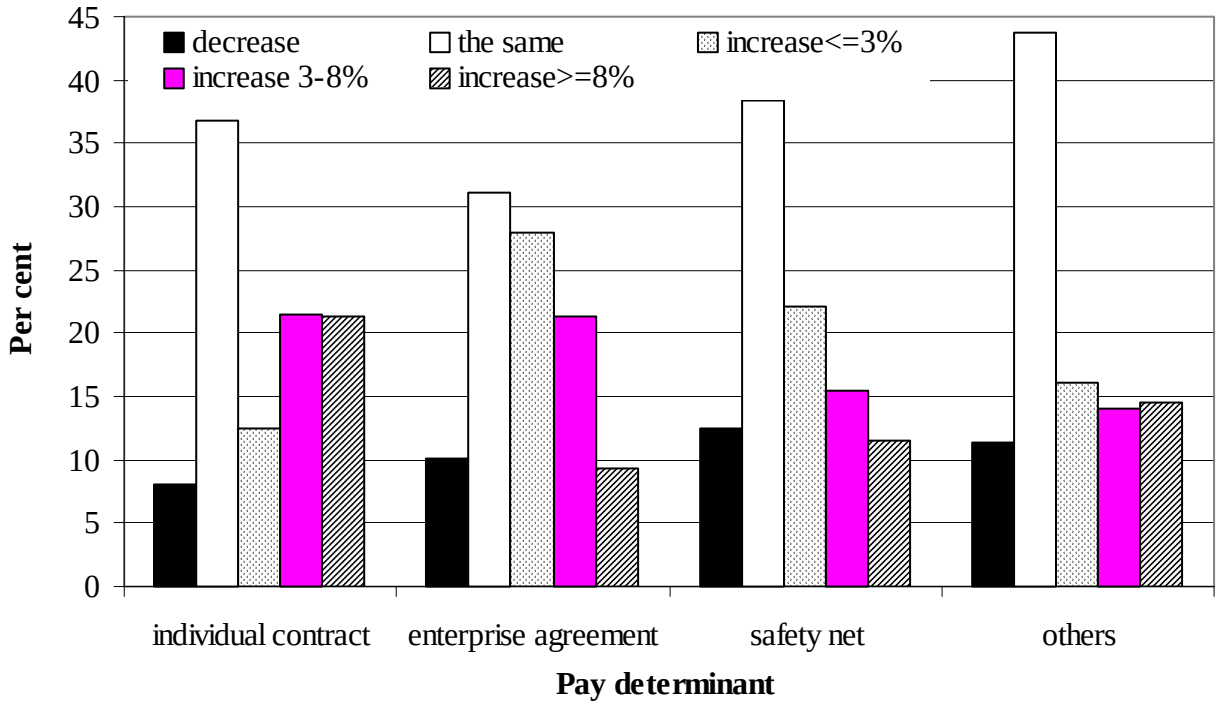
Figure 8 shows that the workers, whose total pay is determined by an enterprise agreement, are least likely to incur a zero pay change. Among the four different pay regimes, enterprise agreement recorded the largest percentage of individuals with small pay rises. By contrast, pay changes of workers on individual contracts are more dispersed. More than 20 per cent of workers on individual contracts gained more than 8 per cent, and 22 per cent reported 3 to 8 per cent, while only about 13 per cent earned a pay increase of less than 3 per cent. This may reflect the nature of individual contracts, with pays changing at less regular intervals (for example, only at the expiry of the contract, but with larger increases at the renewal). On the other hand, since these pay changes are specific to an individual larger variations may be permitted.

The figure for the Safety Net is less intuitive.[13] Surprisingly, larger proportion of workers on the Safety Net reported pay reductions compared with workers on individual contracts and enterprise agreements. We expect that the proportion of individuals with small pay increases would be larger for Safety Net than other pay systems, since it is unlikely that workers will experience a

[13] Individuals on Safety Net refer to those who are paid according to award rate.

pay cut or large pay increase if they are paid exactly the award rate. However, people who answered that their pay is determined by award may be paid more than the award rate, which means it is still possible to have pay cuts[14]. Change to working hours may be another reason for large total pay rises or pay cuts. Also, we cannot ignore the existence of measurement errors in this type of survey.

Figure 8 Changes in total pay by pay determinant



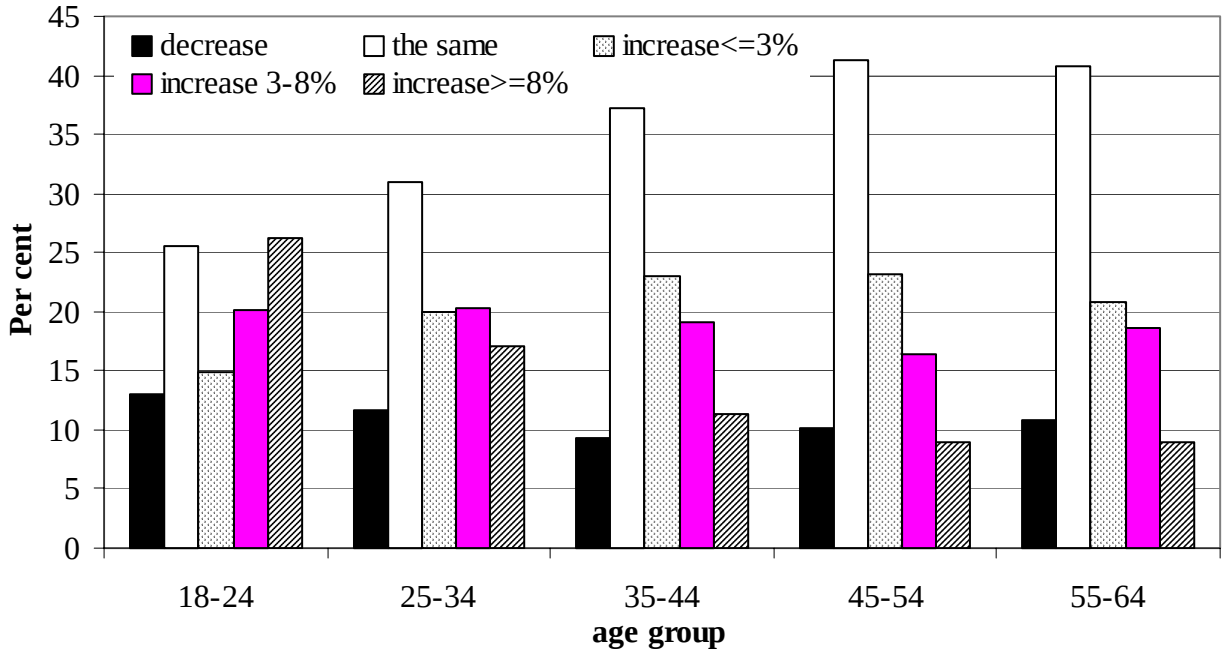
Pearson chi2(12) = 236.8965 Pr = 0.000
Source: MIWS August 1997–May 2000, N=5335.

Figure 9 presents the distribution of pay changes by age. As expected, old workers have more stable total pay than young workers. Only 25 per cent of individuals aged 18 to 24 reported that their total pay was unchanged. Young workers are more likely to receive large pay increases due to the institutionalised age increments but they are also more likely to receive pay decreases than older workers. It is possible that the rate of on-the-job skill acquisition is faster for younger workers. On the other hand, youth and new labour market entrants may make poorer job matches and lead to a larger proportion of them received pay cuts compared with other age groups.

[14] For example, they were paid 10% over award rate last year which could be reduced to 5% over the award rate this year.

Although young workers' working hours varied more than those of older workers, this does not explain the different rate of pay cuts because the same patterns are found for workers who kept the same working hours.

Figure 9 Total Pay changes by age



Pearson chi2(12) = 179.6797 Pr = 0.000
Source: MIWS August 1997–May 2000, N=5345.

Gender differences in the distribution of pay changes favoured male workers. Although the proportion of workers reported no change in their total pay are similar for males and females, a smaller proportion of male worker reported pay cuts and a larger proportion of male workers reported 3-8 per cent pay increases. Part-time workers, the majority of whom are casually employed, are more likely to receive decreased or unchanged total pay. The percentage of part-time workers who received pay cuts almost double the percentage of full-time workers. However, this difference is largely due to the more flexible working hour arrangements. As shown in Table 1, the gap is much smaller when we restrict the sample to those who kept the same working hours. For this sub-sample, part-time workers' total pay is more likely to remain unchanged than full-time workers and full-time workers are more likely to receive large total pay increases.

Table 1 Total Pay changes by gender and by part-time/full-time status

	decrease	the same	increase<=3%	increase 3-8%	Increase>=8%
sex:					
female	12.84	36.51	22.53	15.72	12.40
male	8.55	35.45	20.47	21.38	14.15
part-time/full-time status:					
part-time	16.30	39.13	19.75	11.67	13.14
full-time	8.17	34.46	22.14	21.59	13.63
part-time/full-time status (the same working hours only)					
part-time	8.34	46.16	24.03	12.79	8.68
full-time	6.42	37.72	22.98	21.58	11.29

5. Sources of wage changes

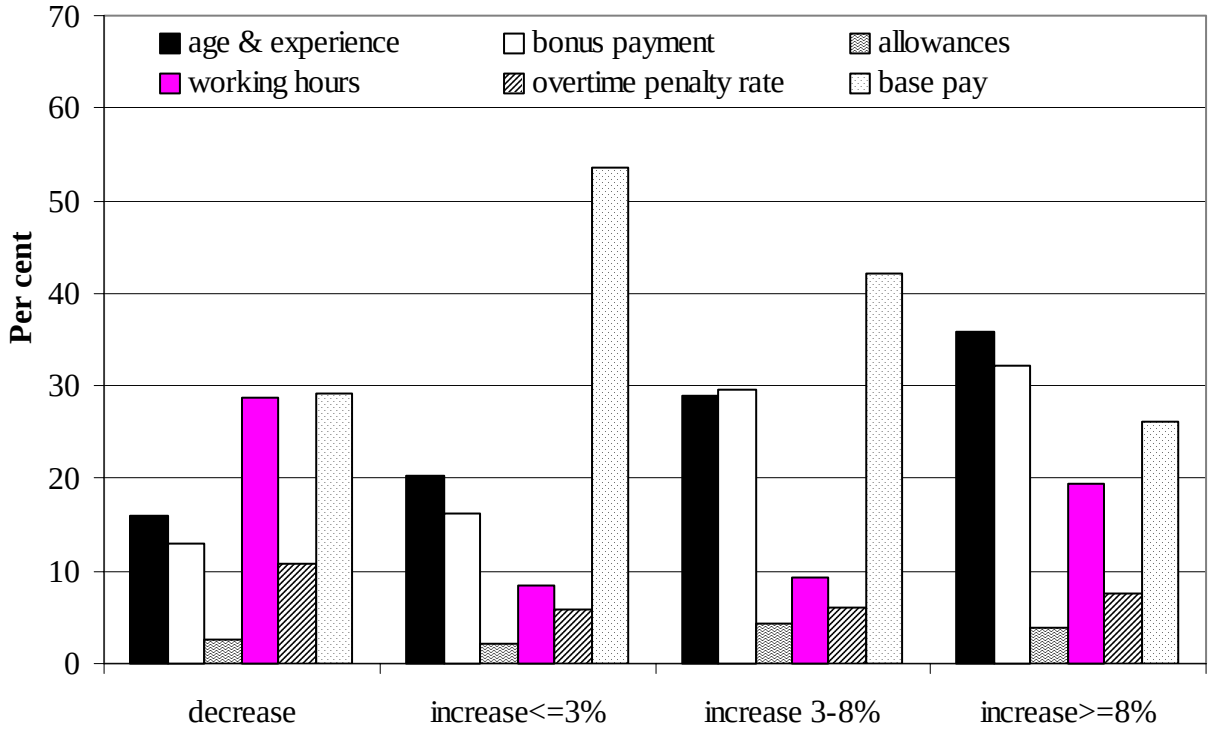
This section explores whether the pay change arises from changes to base pay (basic company pay scale), hours, bonuses and performance loadings, penalty rates, other allowances or from the effects of age and experience.

Figure 10 presents the sources of pay changes by different rates of pay change.[15] Individuals with large pay increases are more likely to have more than one source of pay changes; therefore, the sum of the six percentages of sources for this group is larger than for others. In general, age or experience, bonus payment changes, and base pay changes are the most common sources of total pay changes. Changes to hours worked are also an important factor driving pay cuts and large pay increases. Small pay increases mainly derive from base pay changes, while age or experience, and bonus payments contribute a significant proportion to large pay increases.

Changes to working hours are the main source of pay cuts. Pay cuts due to decreases in working hours may be initiated by individuals and thus careful interpretation of the implication of total pay cuts on wage rigidity is important. They are different from the pay cuts due to low productivity.

[15] In each pay change category, the sum of percentage reporting changes in the six different sources may exceed 100 since multiple choices are allowed.

Figure 10 Percentage of respondents reporting changes in pay, by reason and by scale of total pay changes.



Source: MIWS August 1997–May 2000.

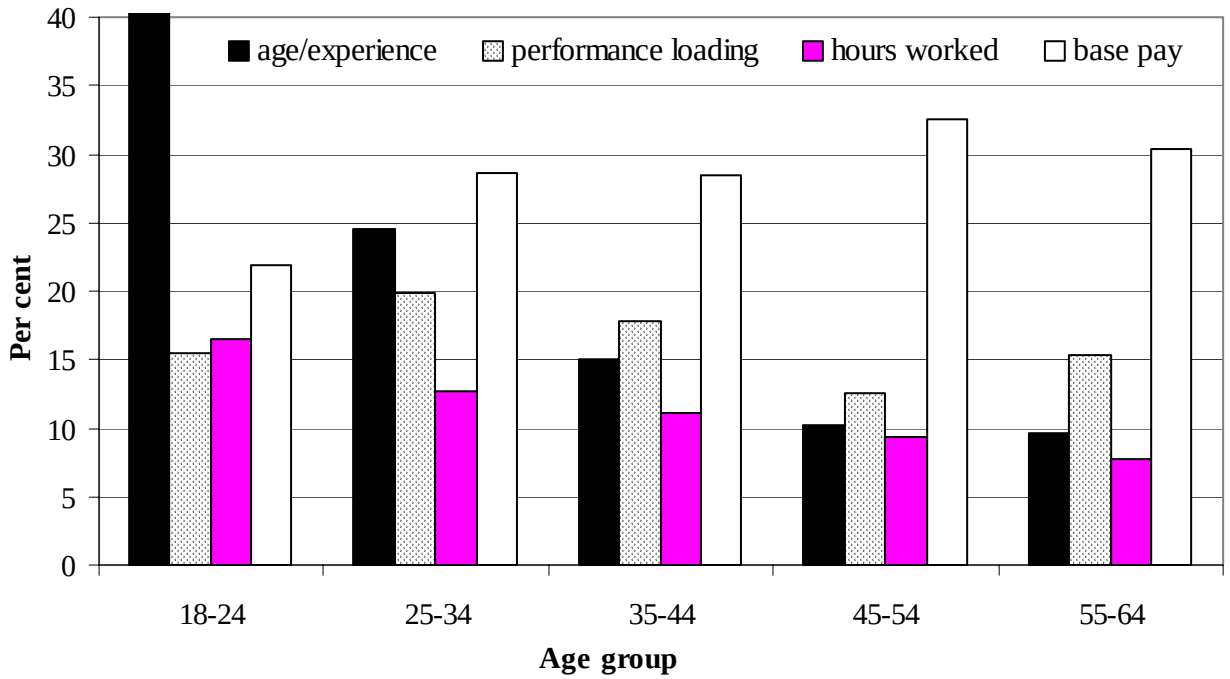
Figures 11 to 13 compare the percentage reporting a change in the four different main sources, age or experience, performance loading and bonus payment, working hours, and base pay by different demographic and job characteristics. As expected, age or experience is the major source of pay changes for young workers and its importance decreases as age increases. Working hours are generally more stable for mature and old workers. Therefore, young workers have the largest percentage reporting a total pay changes due to hours worked. Changes in bonus payment are more common for people aged 25–34 and 35–44, possibly because they are the hardest working groups as they are at an important stage of their career development. It could also be caused by the different job characteristics obtained by individuals in different age groups.

Figure 12 shows that base pay followed by hours worked are the most common source of pay changes for machine operators and labourers. Pay changes due to age or experience are less common for labourers, and this implies a flatter age-earning profile for this low skilled group than occupational groups. Since age or experience could be regarded as a proxy of human

capital, the low percentage of labourers reporting a pay change due to experience may reflect the fact that less human capital is accumulated through learning on the job. By contrast, skilled workers accumulate more human capital over time, and therefore the percentage of managers and professionals reporting pay changes due to their age or experience is larger than for other occupational groups. Since the performance of managers and professionals, clerks and sales persons are easier to assess and be rewarded, bonus payments are also an important source of pay changes for these two groups due to their job characteristics.

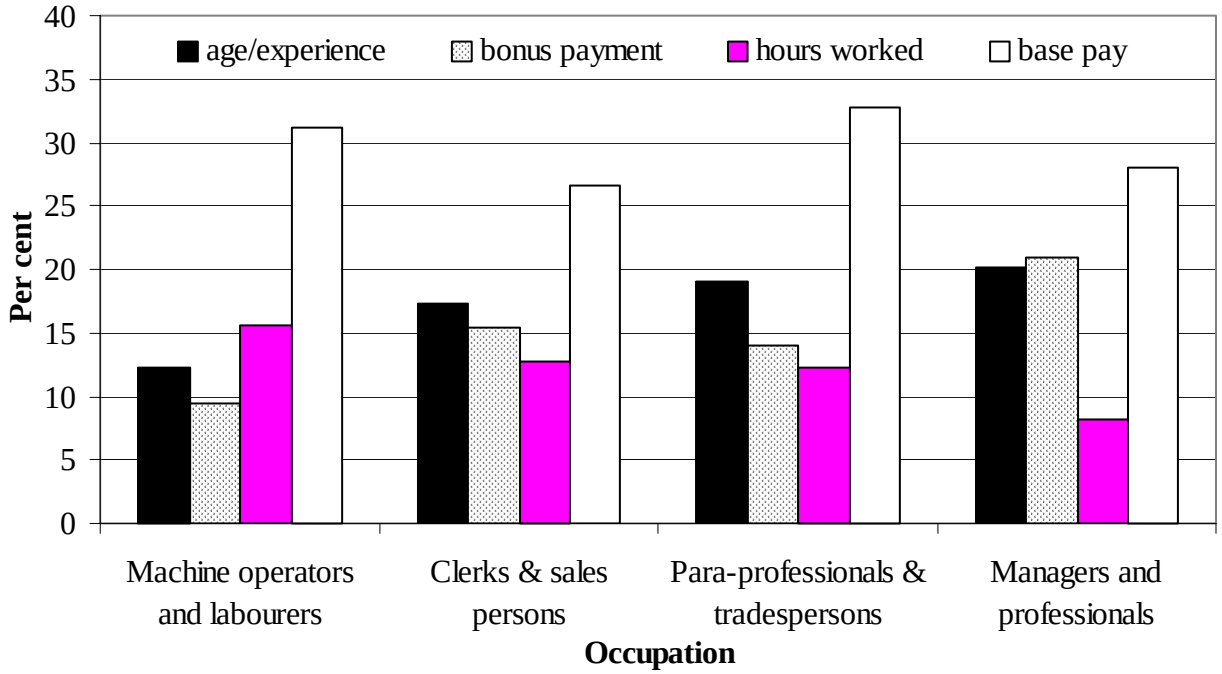
From Figure 13 we can see that performance loadings and bonus payments have the most important role for the pay changes of workers on individual contracts. Very few workers on the Safety Net reported a change in their performance loading. Some of them may not have a performance loading at all. For workers on enterprise agreements and on the Safety Net, base pay is the most commonly reported source of pay changes. There are fewer differences between the percentage reporting pay changes due to hours worked among different pay regimes.

Figure 11 Percentage of respondents reporting changes in pay, by reason and by age



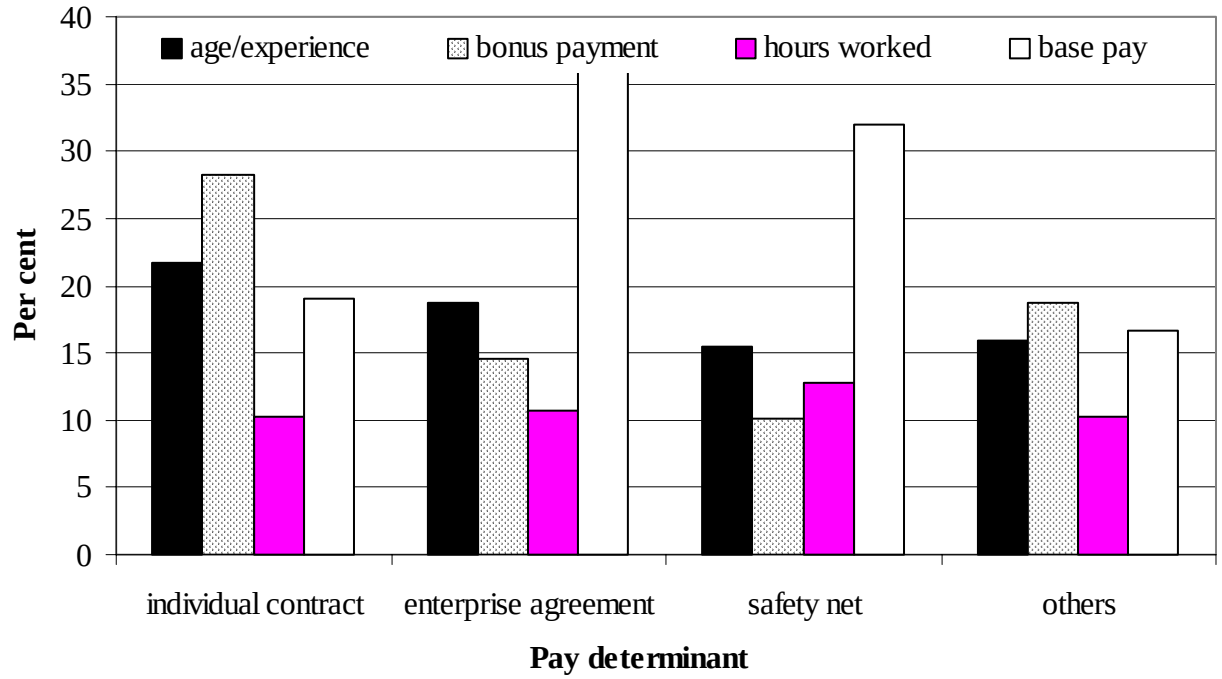
Source: MIWS August 1997–May 2000.

Figure 12 Percentage of respondents reporting changes in pay, by reason and by occupation



Source: MIWS August 1997–May 2000.

Figure 13 Percentage of respondents reporting changes in pay, by reason and by pay determinant



Source: MIWS August 1997–May 2000.

6. Conclusion

The paper has investigated the distribution of wage changes for job stayers to explore the nominal wage flexibility during the period of 1997 to 2000. The relationships between pay changes, sources of pay changes, and job and personal characteristics have also been examined to understand the dynamics of individuals' earnings.

Similar to the Dwyer & Leong (2000) study, the analysis based on MIWS data found evidence consistent with downward nominal wage rigidity. Only 10.8 per cent of all interviewees and 7.4 per cent of workers with constant hours reported total pay decreases, which is considerably less than one would expect if the distribution of wage changes followed a normal distribution. The large spike at zero changes may imply that nominal wage cuts are not a preferred instrument for employers who find they have bad matches or that they want to reduce employment. In addition, it may reflect resistance to wage cuts by employees. As mentioned in section 3, measurement error may also be a reason for the relatively large proportion of job stayers who have zero wage changes.

The analysis has shown that skilled workers, such as tertiary graduated workers, managers and professionals, are more likely to receive large pay increase and less likely to receive pay cuts. This may imply a strong demand for skilled labour in recent decades due to skill-biased technological change, resulting in a greater bargaining power for these workers. Young workers and people on individual contracts are also more likely to receive large pay increases.

Age or experience, base pay, and bonus payments are the most common sources of total pay changes. The largest pay increases are due to changes in bonus payments and age or experience. Changes in working hours explain most of the pay cuts, while the percentage of those individuals who experienced pay cuts and reporting changes in bonus payment is relatively low compared with those who received pay increases.

The commonality of sources of pay changes is in general consistent with job characteristics and the amount of pay increase. Age or experience is the most important source of pay change for young workers. Managers and professionals are more likely to receive performance loadings and they are also more likely to receive large pay increases. The same is true for workers on

individual contracts. As expected, changes to base pay (company pay scales) accounts for most total pay changes among workers on enterprise agreements and the Safety Net.

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