ISBN 87-7882-020-0 (print)
ISBN 87-7882-021-9 (online)

WORKING PAPER 04-19

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The Prevalence of Internal Labour Markets - New Evidence from Panel Data

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Abstract

In recent years, a small but growing literature concerned with the empirical analysis of the workings of internal labour markets has emerged. These studies, which have almost exclusively been based on personnel records data from single firms, notably Lazear (1992) and Baker, Gibbs and Holmström (1994), have begun to provide some empirical evidence on many of the issues raised by the primarily theoretical field of personnel economics.

Instead of one further single firm study, this paper uses an employer-employee linked data set based on 222 Danish private sector, medium-sized or large firms during the period 1980 to 1995. The principal aim of the study is to look for evidence of internal labour markets by focussing on whether there are stable careers, whether being an incumbent has advantages for one's subsequent career, and on to what extent and how wages are set within the firm. We also examine the influence of the external labour market on wage setting within firms.

The data set allows us to examine whether firms differ, and if so, if there are industry-specific differences or differences between growing, stable, and declining firms. Moreover, our study provides insights different from those of earlier work by comparing the internal labour markets of managerial employees with those of the much less studied non-managerial workers.

JEL Codes: J40, J41, J31

Keywords: Internal labour markets; Careers; Promotions; Firms' wage structures

Acknowledgements: We would like to thank audiences at seminars in Berlin, Madrid, Lyon and Aarhus as well as the NBER 2003 Summer Institute for stimulating discussions. We are grateful to Thomas F. Hansen, Rikke Ledager and Jens Therkelsen for able research assistance, and the Danish Social Science Research Council for financial support.

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1 Introduction

Economists' interest in the workings of the internal labour markets of firms has increased considerably in recent years resulting in a rapidly growing body of research, most of which at first was of theoretical nature; see the surveys by Lazear (1999) and Gibbons and Waldman (1999). As a consequence, a whole new field within labour economics dealing with the inherently economic questions concerning compensation, incentives and turnover – personnel economics – has emerged. The literature has increasingly turned to empirical analyses of what goes on inside firms, but empirical evidence is still relatively scarce in this area.

Why do economists care about the internal workings of firms and their labour practices in particular? The concept of internal labour markets is sometimes interpreted as a specific form of incentive structure, a hierarchical organisation with distinct ports of entry and career ladders and which to a large extent shelters its employees from influences of the external labour market. Wage setting is typically administered via a series of bureaucratic procedures. Other features of internal labour markets are on the job training with a substantial element of firm-specific human capital investments, well-defined procedures and company norms; see Doeringer and Piore (1971). Incentives to good performance emanate from the competition for being promoted and from the fear of job loss which implies that the workers have to start all over again at the port of entry level in another firm. A drawback of this organisational form is that competition may decrease higher up in the hierarchy, due to lack of competition from outsiders. On the other hand, an advantage of internal labour markets is that firms learn about their employees' productivity, use this information in assigning workers to jobs and can consequently save on hiring and screening costs. Another advantage frequently mentioned is that the long run career perspectives provide workers with incentives to skills acquisition (Gibbons (1997)).

Obviously, an interesting question is whether this is a plausible description of how firms' actual internal labour markets are set up, or not. A related question is whether this organisational form, as have been suggested by several observers, is becoming less important over time.[1] Other reasons for why it is important to learn more about the functioning of labour markets within firms are that differences in how they are organised may explain differences in corporate

[1] Eriksson (2003) makes use of the same data source as the current paper in addressing this issue.

performance and that internal labour market considerations may be central to improving our understanding of wage determination.

Past empirical studies of the working of firms' internal labour markets have primarily used data from individual firms (Lazear (1992), (1999); Baker, Gibbs and Holmström (1994a),(1994), Hamilton and MacKinnon (1996), Seltzer and Merrett (2000), Treble, van Gammeren, Bridges and Barmby (2001), Lima (2000), Lin (2003), Dohmen, Kriechel and Pfann (2004), Dohmen and Pfann (2004)) or occupations (Ohkusa, Brunello and Ariga (1997)). This has been due to the fact that national panel data sets that permit analyses at the firm level have not been available. In particular, existing longitudinal data sets have until recently not included many employee observations for each firm implying that it is hard to distinguish between within and between-firm effects. Two recent exceptions are the papers by Lazear and Oyer (2004) and Gibbs, Ierulli and Meyersson-Milgrom (2003) which have made use of a Swedish linked employer-employee data set to address some of the questions raised in Baker et al. (1994a,b). Although economists traditionally have held a healthy sceptical position towards case studies, it should be noted that there also are some advantages associated with examining a single firm or single occupations. Thus, for example, definitions of job levels and promotions, two key concepts in the study of internal labour markets, are clearer and much easier to operationalise in a single firm study than in the case when the data emanate from surveys on individuals or employer-employee linked data as in the current paper. Still, the previous studies of course only beg the question: can their results be generalised?

This paper uses a sample of 222 Danish, medium-sized and big firms, that is, firms which have had at least 200 employees in each year during the period 1980-95. Our findings are based on a study of a broad array of firms, workers and occupations and should usefully complement the evidence obtained from previous studies of individual firms and occupations. Furthermore, our study provides insights different from those of prior work. More specifically, we (i) contrast growing, stable and declining firms, (ii) compare firms from different industries, and (iii) extend the analysis of internal labour markets to other personnel categories than the previously examined managerial employees. However, use of data that do not originate from firms' personnel files has a price: they do not allow us to identify jobs at the same detailed level as for example in Baker *et al*. (1994) and as a consequence, we have to make use of a cruder

division of the workforces into job-levels instead.

Like in earlier studies, our approach is mainly of descriptive/explorative nature; the principal aims are to look to evidence of internal labour markets and for evidence of the institutional labour economics description of internal labour markets as summarised by Doeringer and Piore (1971) in their oft-cited book. The four distinguishing features of internal labour markets[2] are: (i) entry to internal labour markets is via certain jobs or ports of entry, (ii) rules regarding job security, career arrangements and so on differentiate the insiders from the outsiders to the firm, (iii) employees are paid according to administrative rules and customs, that is, wages are tied to jobs rather than individuals, and (iv) wages are influenced only weakly by conditions in the labour market external to the firm.

The remainder of the paper is organised as follows. Next we give a brief summary of previous research. This is followed by a description of the data used. The fourth section looks at whether there are ports of entry and exit and features of within firm careers in our sample of firms. The fifth section considers wage setting in firms and the sixth section offers some brief conclusions.

2 Previous research

The first empirical, economic analysis of the internal workings of a firm's labour market is to be found in a book chapter by Lazear (1992). The study which has received a lot of attention, and which has generated a number of similar papers, is the one reported in three papers by Baker, Gibbs and Holmström (1993; 1994a,b). In short they find that an internal labour market exists in the firm they study (at least for the managerial employees they examine), but the evidence on the underlying conditions suggested by theory as necessary to support internal labour markets is mixed.

Four recent studies have attempted to replicate Baker et al. (1994a,b) or parts thereof. The study coming closest in mimicking the design and data of Baker et al is Treble et al. (2001). They have data from the personnel and payroll archives of the British operations of a firm – a

[2] There are several reasons for why labour markets typically differ from spot markets: firm-specific human

financial institution – with about 60.000 employees (whereof a third are part-time employees) for the years 1989 to 1997. During the period, employment in the firm decreased, predominantly in the non-managerial grades, by about 20 per cent. The analysis in Treble et al. point to striking similarities with that of Baker et al.; indeed, as summarized by the authors: "....although the two firms operate in different countries, with different employment law, regulatory and educational systems the structure of the two firms are remarkably similar".

The study by Seltzer and Merrett (2000) is also concerned with a financial institution. The authors examine the personnel records of an Australian Bank at the end of the nineteenth century and find some evidence of internal labour market features: distinct ports of entry, bureaucratic rules constraining wage relations and extreme nominal (and real) wage rigidity. On the other hand, demotions were quite common, although not associated with wage decreases, and wages were not strongly tied to jobs. Another study using personnel records from about the same time period, but from the Canadian transports industry – Hamilton and MacKinnon (1996) – documents an increasing importance of long-term employment relationships and that workers in these relationship are strongly shielded from company-specific and macro-economic downturns.

Lima's (2000) analysis is concerned with a large Portuguese firm with about 19.000 employees for which there is data for the years 1991 to 1995. Unlike in the other studies, the firm studied is not from the financial sector. Some particular features of this firm are that it is a multi-establishment company (30 establishments) and that a very high proportion of its employees are classified as either top executives (16 per cent) or middle level managers (21 per cent).[3] The firm has in common with that of Baker et al. that a high proportion of its employees – 60 per cent –stay in the firm during the 5-year period.

The only papers we are aware of that makes use linked employer-employee data from a large sample of firms are twopapers based on data from the Swedish Employers' Confederation covering most of the private sector in Sweden (except for the financial sector) in years 1970-1990. These studies, Gibbs, Ierulli and Meyersson-Milgrom (2003) on job-level, firm and

capital, incentives and matching are the three most analysed.

[3] In addition, 10 per cent of the employees are supervisors. Consequently, Lima's analysis (like Baker et al. (1994a,b)) mainly focuses on managerial employees.

occupational mobility, and Lazear and Oyer (2004) on ports of entry are all restricted to the white-collar employees.

3 Data description

It should be noticed from the outset that there are few barriers to mobility between firms in the Danish labour market. For the employers, the costs of laying off workers are low owing to the absence of severance pay legislation and experience rating in the unemployment insurance system as well as weak job security of (especially blue collar) workers. For the employees, the costs of changing employer and experiencing unemployment are lowered by generous unemployment benefits which are readily available to unemployment insurance members and by the fact that social benefits, pension and vacation pay are independent of the individual's employer. Since the Danish labour market is relatively flexible in the above-mentioned respects, possible differences compared to the previous single firm studies, are unlikely to stem from institutions and regulations preventing Danish firms to have implemented internal labour markets.

The sample used in this paper comes from a much larger data set, the Integrated Database for Labour Market Research (IDA) maintained by Statistics Denmark. IDA includes register-based information on *all* firms and *all* residents in Denmark during the period 1980 to 1995. Persons and firms[4] are matched at the end of November each year. Both firms and individuals are assigned a unique identification number and can consequently be followed over time.

For this study we use information on a sample of 222 Danish private sector firms which have existed for the whole 1980 to 1995 period and which have had at least 200 employees in each year during the same period.[5] Every individual that at some point of time during the period 1980-95 has been employed in one of the 222 firms is included in the data set. The total number of individuals included is 726,211.

[4] Actually, persons are matched to workplaces and workplaces are aggregated into firms.

[5] Thereof, 126 (92) firms had 300 (400) or more employees in each year.

The motivation for adopting this sample design is the focus of this paper on the workings of firms' internal labour markets. In order for the concept of internal labour markets to be meaningful, the firms under study should exceed a certain size[6] and should, moreover, have existed for a reasonably long period of time. What constitutes a plausible size or length of the period is of course to some extent inevitably arbitrary. We have chosen a relatively low size limit which allows us to check for whether size matters.[7] The other restriction that the firms should have existed for all 16 years is motivated by the fact that in some of our analyses we will focus on newly hired employees and follow their careers within the firms during the subsequent ten-year period.

For each employee in the firms the data set contains information about the employee's individual characteristics: gender, age, education, labour market experience and tenure in firm. The job held by the employee is classified according to a scale with six job levels:

job level 1: top managers (chief executive officer, vice president),
job level 2: high level managers,
job level 3: middle management and supervisors,
job level 4: (non-managerial) white collar workers and skilled blue collar workers,
job level 5: unskilled blue collar workers, and
job level 6: other employees.

This is a rather crude job classification, especially compared to the detailed classifications used in the single firm studies, implying that we cannot carry out an analysis of issues concerning promotions at the same level of detail as in Baker et al.[8] *Table 1* gives some basic descriptive information about the firms and the employees in the data set. We can see that about half of the

[6] All previous single firm studies have been concerned with very large firms. As shown by Ohkusa et al. (1997) large firm size is not, however, synonymous with an internal labour market, that is, a certain firm size appears to be a necessary, but not a sufficient condition.

[7] Clearly many of the firms included are substantially smaller than the ones studied by Lazear (1992) and Baker *et al*. (1994). This reflects partly the fact that Denmark is a small country, partly the Danish firm size structure typical of which is only a small number of larger firms.

[8] In fact, the data set contains information about the employees' occupations in each year. We have tried to make use of that in order to construct a more detailed job classification, but have not been able to find a classification, which can be used consistently for applications on firms from widely different industries.

firms have less than 500 employees and that there is a slight shift upwards over time in the size distribution of the firms. This is to be expected as a consequence of the restriction that the number of employees should never fall below 200 in any of the years. However, the annual growth rates in employment differ quite a lot across the firms, and a little less than half of the firms have actually experienced declining employment during the period. Every second sample firm is from the manufacturing sector, 20 per cent are from the trade sector and the remaining 30 per cent from services.

As the employers are from the private sector, the majority of the employees − a little over 60 per cent − are men. The age structure of the firms' workforces has remained unchanged during the period whereas the educational level of the employees has risen considerably; the proportion with only compulsory education (that is, 9 years or less) has fallen from 32 to 22 per cent and the share of persons with more than 12 years (corresponding to high school) has grown from 23 to 38 per cent. The distribution of the workers according to job levels has only undergone small changes during the 15-year period. The proportion of unskilled blue-collar workers has fallen by four percentage points whilst the group "other" has grown equiproportionately.

Averaging over all firms, a clear positive wage-job level relationship can be noticed. The proportions of hires into the two lowest job levels exceed the employment shares of these job levels. Going beyond the aggregate numbers (which to save space we do not show here), it can be seen that the higher than proportional hiring into the lowest job levels − ports of entry − is particularly pronounced in the retail/trade sector. Another feature masked by aggregating over industries is that, with the exception of the manufacturing firms, the hiring rate into the salaried/skilled worker-level exceeds the employment share of the level. Not surprisingly, average age and average experience are higher at the higher job levels. Educational levels also typically rise with job levels. Top managerial job holders have, however, on average less education than middle level management and other white-collar workers.

4 Are there within-firm careers?

A key feature of internal labour markets is well-defined career paths which not only serve as an incentive mechanism but also as a mechanism which helps the firm to learn about its employees.

Thus, assessing whether there are clear traces of careers inside firms or not, is very important for our understanding of firms' internal labour markets.

4.1 Length of employment relationships

We start by examining how long employees remain with their firms, or put differently, whether there are long-term employment relationships with career properties. The point of the departure in *Table 2* is the persons who were hired from outside the firm during the period 1981-85. These individuals are followed up to 1995. As can be seen from the first column, about 70 per cent did not stay with their employers for longer than 4 years and 17 per cent remained with the same employer for over 10 years. The differences with respect to which job level the individuals were hired into are small, except for the lowest job level. Of this latter group almost 90 per cent have left the firms after five years. Notably, the proportion of employees staying in the firm is close to the average also for managerial employees. Thus, their share is considerably lower than in the firm examined by Baker *et al.* (1994), where at least 60 per cent of remained with the firm for more than five years. On the other hand, the proportion of managerial employees remaining with the firm studied by Treble *et al.* (2002) for five or more years was 38 per cent, which is considerably closer to the 30 per cent share we find on average in our sample of firms.

The probability of exiting the firm declines with the duration of the employment relationship. Some simple calculations based on Table 2 show that the annual exit probability after the first year falls to 24-25 per cent and as from the fifth year drops further to about 12 per cent. The relatively high turnover rates observed for Danish firms may to some extent be due to the fact the newly hired are younger than those already employed. But as can be seen from the table, the differences are relatively small, and except for the job level "other", the average age of new hires are 30 or above. Not surprisingly, the average age of the new hires is increasing in the job level.

In order to shed further light on the heterogeneity among firms, we have ordered the firms into quartiles on the basis of the proportion of employees with careers within the firm exceeding 5 years. The median share for all job levels is 26.7 per cent and the differences in the median

values (or first or third quartile limits) between job levels are small. Only the group "other" has distinctly lower shares. Omitting this group, the shares for the third quartile vary between 36 and 45.5 per cent. Clearly, the low average proportion of employees in long-term relationships is found in most of the Danish firms in our sample.

We have estimated an ordered logit model explaining which quartile each firm belongs to. The results, which are set out in *Table 3,* indicate that career frequency is only weakly increasing in firm size. Longer careers are more usual in expanding firms. This is to be expected since using career paths as an incentive mechanism is more difficult when the firm is decreasing and the job opportunities within the firm are declining, too. In fact, it has been argued (Baker (1990), Gibbs (1995)) that one of the reasons for firms turning to performance pay and related incentive schemes is the decline in firms' employment growth.[9]

Two industries, utilities and financial services, stand out as having more careers than others. A common feature of firms in the utilities industry is that they are largely sheltered from competition and operate in rather regulated markets. Firms in financial services typically have clearly defined hierarchies, including authority and communication structures. It should be noticed that four of the previous single firm studies (Baker et al. (1994), Lazear (1999), Seltzer and Merrett (2000) and Treble et al. (2001)) have examined companies within this particular industry. Hence, the picture painted by some of the single firm studies may be a considerably less accurate description of the workings of internal labour markets of firms *outside* the financial sector.

[9] Note also that the influential single firm study by Baker et al. was concerned with a company that experienced a remarkably strong growth during the period under study.

4.2 Promotions

Another key aspect of careers inside a firm is the prospects of being promoted. The higher the proportion of employees hired into a job level that comes from outside the firm, the weaker are the incentives for incumbents to compete with each other (Chan (1996)) and hence, some of the advantages of setting up a firm as an internal labour market with a tournament structure are lost. If internal labour markets are common, we would expect to observe a non-negligible fraction of firms in which it is relatively rare to have people from outside the firm hired into higher-ranked positions. One of the strengths of the single firm studies has been their documentation of such promotion structures and rewards. As noted above, our data set does not allow us to distinguish between job levels at the same level of detail as in for instance in the studies by Baker et al. or Treble et al. Consequently, we cannot compare promotion rates in the firms in our sample with theirs. But we can still hope to shed some light on whether promotion from within is a common procedure in the Danish firms.

For this purpose we have computed promotion rates for each firm and year during period 1981-95 as the ratio:

(1) $\text{proms}(j)/\{\text{proms}(j) + \text{hires}(j)\}$,

where proms(j) is the sum of the number of employees in the firm who were promoted into job level j and hires(j) is the sum of the number of new entrants into level job level j, who were not employed in the firm in the preceding year. The average promotion rates for each job level (1 to 5) and for all job levels combined are set out in *Table 4*. From this it can be seen that the overall promotion rate is relatively low: 13 per cent. Naturally, this is due to both the very crude classification of jobs used and the relatively large weight of the level 5 in computing the average rate.

Turning to the job level specific rates, we find that average promotion rates for job levels 1 to 3 are in the range 0.32 - 0.36, that is, clearly above average. Another thing worth noting is that firm heterogeneity is larger for the higher job levels. In most of the firms, less than half of the new employees in job levels 1 to 3 are promoted from within. It is only as we move up to the

highest quartile that promotion rates exceeding 40 or 50 per cent are observed. This implies that only a fairly small proportion of the Danish firms are organized as internal labour markets.

In order to examine how firms, which make use of internal promotions, differ from those that do not, we have estimated ordered logit models for promotion rate quartiles (corresponding to those for tenure quartiles); see *Table 5*. Beginning with the overall promotion rate, we may note that firm size (that is, average number of employees during period) has a tiny, positive effect on the promotion rate. Firms' promotion rates are negatively related to their employment growth rates. The finding that firms that are expanding their employment appear to recruit more of their personnel from outside the firm holds also for promotions into specific job levels. Regarding industry differentials we can see that the utilities and financial services industries have higher promotion rates than manufacturing, and moreover that in utilities this is due to higher promotion rates into lower level jobs and in financial services into managerial job levels.

4.3 How do external and internal hires fare?

Next we turn to the question also addressed by Baker et al. (1994a): how do those promoted from within differ from those hired from outside? If internal labour markets are important, we would expect firm-specific human capital to be central to who are promoted or hired into jobs as well as to their later career performance. In order to shed some light on these issues, we restrict our analysis to the three highest job levels (for which promotions are better measured) and for comparison purposes create two samples of employees: incumbents and outsiders, respectively. The *incumbents* are those who in years 1981-85 were promoted into the three job levels from *within* the firm. The *outsiders* are those employees who during the same years were hired into these same job levels from *another firm* and whose previous job was at a *lower* level than the new one. This gives us on average 8,720 incumbents and 5,082 outsiders per year.

As can be seen from *Table 6*, the incumbents and outsiders differ with respect to some of the observable characteristics (all at the time of promotion). As expected, outsiders have more general human capital, as captured by years of education. The difference is on average 0.5 years. On the other hand, the incumbents are clearly older; the difference is about 4 years. This is a

rather large difference and moreover, the opposite of what was observed for the Baker et al. and Treble et al. firms.[10] Incumbents also earn about 8-10 per cent more than the outsiders. Moreover, they are on average employed in larger firms, or put differently, larger firms are more probable to promote from within.

We may note from Table 6 that considerably fewer of the incumbents had left their employers 3, 5 or 10 years later. The difference is particularly pronounced after 3 and 5 years. At the same time a slightly higher proportion of the incumbents were promoted (at least) once more. These two observations are clearly supportive of the internal labour market characterization of firms. The wage growth of the outsiders is stronger, especially in the first five years. After ten years the average wages of incumbents and outsiders have more or less converged. There is greater variation in the wages of outsiders, indicating that their careers are more variable than that of the incumbents. It should be noted, however, that these differences are between averages from two groups the compositions of which differ.

In order to control for differences in individual characteristics we next estimated multinominal logit models for exiting, staying in same the firm and at the same job level, and staying in the firm and being promoted, respectively, three, five and ten years later. The key explanatory variable we are interested in is a dummy for whether the employee when promoted in 1981-85 came from within or from outside the firm. Age, years of education, size of firm, industry (all recorded at the time of the first promotion observed), gender and year dummies for promotion are included as controls. According to the estimates in *Table 7*, the incumbents are much more likely to stay with the firm than those promoted from outside. However, the probability that an incumbent would be promoted further does not differ significantly from that of the outsiders. Consequently, the firm specific human capital possessed by the incumbents does not appear to be an advantage for further promotions.

Finally, we estimated wage growth equations for those remaining with the same firms using 5 and 10-year windows, and entering the same explanatory variables as in the multinominal logits above plus three new indicators: one for incumbents that have not been promoted further, another for those incumbents that have, and a third for outsiders that were promoted again (the

[10] Treble et al. (2001) do not report differences in individual traits for incumbents and outsiders.

omitted reference category are the non-promoted outsiders); see *Table 8*. We find that the wages of those that have been promoted further have, not unexpectedly, grown at a faster pace than that of those who were not. However, the further promoted outsiders' wages have grown more than that of the promoted incumbents.

Thus, we find that being an incumbent does not significantly improve the employee's chances of further promotions. Nor does it constitute an advantage for the promoted employees in terms of subsequent wage growth.

5 Wage-setting in firms

A cornerstone of the Doeringer and Piore (1971) characterisation of internal labour markets is the notion that wages are attached to jobs and to a lesser extent to individuals and their human capital. *Table 9* contains some panel data estimations of wage equations of the following form:

$$(2) \qquad \ln W_{ijt} = \alpha_i + \beta_j + \sum \gamma_k X_{ijtk} + \varepsilon_{ijt}$$

where *i* refers to person, *j* to firm and *t* to year. We have used hourly wages as the independent variable and have in addition to the conventional human capital variables in X: age, tenure, years of schooling and gender, and firm and year dummies, entered six job level dummies as explanatory variables. Furthermore, we have included some interactions between macroeconomic variables and the firm promotion rate dummies, and between the job level dummies and the employee's tenure in the firm. The rationales for including them will be explained below.

The three first columns show estimates from three different specifications; the first with only human capital variables, the second with only job levels, and the third with both sets of variables included. In columns 4 to 6 the same specifications are estimated but now augmented with individual fixed effects instead of firm fixed effects.

The human capital variables attach coefficients comparable to those obtained in previous studies of individual earnings differentials in Denmark. Also, as in previous studies, human capital explains a relatively modest share of the variation in individual earnings. As can be seen from column 2, the six job level indicators and firm fixed effects explain a little over half of the variation in wages. From the third column we can see that adding job levels to human capital does not result in any major changes in the coefficients to the human capital variables, except for a slight reduction in their magnitudes. Although the job level coefficients decrease considerably when human capital is entered, they still differ significantly from zero. They trace a convex wage-job level relationship, which is somewhat blurred by the estimate for job level 5 (unskilled blue-collar workers). Furthermore, the estimations clearly show that job levels matters; catering for human capital, firm and year effects, including the job level indicators increases R^2 from 55 to 65 per cent. Thus, in this respect the results obtained resemble quite closely those of Baker et al. (1994), Lima (2000) and Treble et al. (2001).

The same pattern is obtained when the wage equations are estimated with individual fixed effects instead of firm fixed effects. There is one main difference, however. The marginal contribution of the job levels to R^2 is substantially smaller and close to zero. This is also to be expected since controlling for individual fixed effects, the job level estimates emanate from individuals' job level changes. Since there is a lot more job changes within the broad job level categories in our data set than in single firm studies with their more narrowly defined jobs, these estimates understate the role of jobs in explaining wage differences.

One key distinguishing feature of the internal labour markets emphasized by Doeringer and Piore (1971) is that employees are to a high extent shielded from competitive pressure from and changes in the external labour market. Consequently, wages are only weakly affected by external labour market conditions. We examine this hypothesis by entering the aggregate unemployment rate and its interactions with dummies for the firm average promotion rate quintiles we studied in section 4.2, as additional explanatory variables. The prediction is that the more important is the firm's internal labour market (*i.e.*, the higher its internal promotion rate), the smaller is the negative influence of the unemployment rate. The estimation results from this exercise are displayed in *Table 10*.

There are three things worth noting in the table. First, unemployment has a negative impact on wages. Hence, employees are not completely sheltered from changes in labour market conditions. Of course, this is to some extent to be expected as the population of firms under study consists of all the major private sector employers in Denmark. Second, the negative impact of unemployment decreases with the importance of the internal labour market. The effects are not large, but the differences between the firm quintiles are relatively big. The negative effect of a change in the unemployment rate for the wages of employees in a firm belonging to the lowest quintile is two thirds to almost twice as large as for employees in firms in the highest quintile. Thus, these estimates provide some support for the notion that internal labour markets shield the employees from changes in the labour market external to the firm. Third, firms with low promotion rates pay their employees higher wages than firms that have high promotion rates. This relation is, however, much weaker when individual fixed effects are controlled for.

6 Conclusions

In this paper we examine whether there is evidence of features associated the existence of internal labour markets in a sample of Danish firms. The aim is to extend the previous single firm studies by analysing firms from different industries, of different size, with differing employment growth records, and by considering also other categories of personnel than the previously studied managerial employees.

For this purpose, we use linked employee-employer data from a sample of 222 Danish medium-sized and big firms during the period 1980 to 1995. The data source is the Integrated Database for Labour Market Research, which is based on a number of registers containing labour market information about the entire Danish population.

In short our evidence on the existence of ILM features in firms is considerably more mixed than that provided by earlier research. We find that employee turnover is relatively high at all levels in the firms. About 30 per cent of newly hired workers have employment relationships lasting more than 5 years. Although there is some heterogeneity – large and expanding firms have higher proportions of careers – the majority of firms do not seem have the long career paths

inside the firm, which were found in the influential single firm study by Baker et al. (1994).

Promotions from within the firm do not seem to be a prominent feature of the majority of the firms in our sample. Being an incumbent, that is, having been promoted from within the firm into one's current job level, does not according to our econometric analysis increase the probability of further promotions. And if promoted further, the incumbent's subsequent wage growth is slower than that of those promoted from outside the firm.

More consistent with the theory of internal labour markets, we find that wages seem to be attached to job levels, and in particular, that job levels explain at least as much of the variation in wages as human capital variables do. We also find that although employees in the firms studied are not completely shielded from external labour market conditions, the negative impact of unemployment on wages is substantially smaller in firms with more internal labour market characteristics than in those with little.

Our analysis of the data reveals that internal labour market features (long careers, internal promotion rates) are much more common in the utilities and the financial services industries. In the latter this is especially the case for the managerial job levels. This is some importance since two of the previous single firm studies (Baker et al. and Treble et al.) have used data from a big financial institution and one of them (Baker et al.) focused on the managerial employees only. Thus, the fairly strong evidence in support of internal labour markets in these two studies may, at least in part, be industry-specific.

References

Baker G. (1990), "Pay for Performance for Middle Managers: Causes and Consequences", *Journal of Applied Corporate Finance* (3), 193-204

Baker G., M. Gibbs and B. Holmström (1993), "Hierarchies and Compensation", *European Economic Review* (37), 366-378

Baker G., M. Gibbs and B. Holmström (1994a), "The Internal Economics of the Firm: Evidence from Personnel Data", *Quarterly Journal of Economics* (109), 881-919

Baker G., M. Gibbs and B. Holmström (1994b), "The Wage Policy of a Firm", *Quarterly Journal of Economics* (109), 921-955

Chan William (1996), "External Recruitment versus Internal Promotion", *Journal of Labor Economics* (14), 555-570

Doeringer P. and M. Piore (1971), I*nternal Labor Markets and Manpower Analysis*. Heath, Lexington Books

Dohmen T., B. Kriechel and G. Pfann (2004), "Monkey Bars and Ladders: The Importance of Lateral and Vertical Job Mobility in Internal Labor Market Careers", *Journal of Population Economics* (17), 193-228

Dohmen T. and G. Pfann (2004), "Worker separations in a Nonstationary Corporate Environment", *European Economic Review* (48), 645-663

Eriksson T. (2003), The potential of firm-level panel data and linked employer-emloyee microdata for employment analysis. Report to the European Commission. DG Employment and Social Affairs

Gibbons R. (1997), "Incentives and Careers in Organizations", in: D. Kreps and K. Wallis (eds), *Advances in Economic Theory and Econometrics*, London, Macmillan, 1-37

Gibbons R. and M. Waldman (1999), "Careers in Organizations: Theory and Evidence", in: O. Ashenfelter and D. Card (eds), *Handbook of Labor Economics* Vol. 3, Amsterdam, North-Holland, 2373-2428

Gibbs M., K. Ierulli and E. Meyersson-Milgrom (2003), Occupational Labor Markets. Paper presented at the NBER Summer Institute workshop on Empirical Personnel Economics

Hamilton B. and M. MacKinnon (1996), "Long-term Employment Relationships in the Early Twentieth Century: Evidence from Personnel Data", *Labour Economics* (3), 357-384

Lazear E. (1992), "The Job as a Concept", in W. J. Burns (ed.): *Performance Measurement, Evaluation, and Incentives*. Boston, Harvard Business School Press, 183-215

Lazear E. (1999), "Personnel Economics: Past Lessons and Future Directions", *Journal of Labor Economics* (17), 199-236

Lazear E. and P. Oyer (2004), "Internal and External Labor Markets: A Personnel Economics Approach", *Labour Economics* (11), 527- 554

Lazear E. and S. Rosen (1981), "Rank-Order Tournaments as Optimum Labor Contracts", *Journal of Political Economy* (89), 841-864

Lima F. (2000), Internal Labor Markets: A Case Study from an Institutional Survey. Unpublished manuscript, Universidad Nova Lisboa

Lin M-J. (2003), The Internal Labor Markets of a Taiwanese Auto Dealer. National Taiwan University, working paper

Ohkusa Y., G. Brunello and K. Ariga (1997), "Occupational and Internal Labor Markets in Japan", *Industrial Relations* (36), 446-473

Seltzer A. and D. Merrett (2000), "Personnel Policies at the Union Bank of Australia: Evidence from the 1888-1900 Entry Cohorts", *Journal of Labor Economics* (18), 573-613

Treble J., E. van Gammeren, S. Bridges & T. Barmby (2001), "The Internal Economics of the Firm: Further Evidence from Personnel Data", *Labour Economics* (8), 531-552

Table 1. The 220 firms and their employees: some descriptive statistics

(a) The firms

	1980	**1995**
Size		
200-299 employees	18.9	18.0
300-399 employees	22.1	17.1
400-499 employees	11.7	14.0
500-999 employees	26.1	24.8
over 1000 employees	21.2	26.1
Average annual employment growth 1980-95:		
2.5 per cent or more	14.4	
-2.5 per cent or less	27.0	
between 2.5 and -2.5	58.6	
Industry (in most years):		
Agriculture	0.4	
Manufacturing	52.3	
Utilities	4.5	
Construction	5.0	
Trade, hotels, restaurants	18.5	
Transport and communications	3.6	
Financial intermediation	11.7	
Services	4.0	

(b) The employees

	1980	1995
Individual traits:		
Male	61.6	62.4
Age	38.0	38.1
Education:		
9 years or less	31.7	21.6
10 years	11.1	13.1
11-12 years	34.3	27.0
more than 12 years	22.9	38.3
Job level:		
High level manager	0.5	0.3
Middle level manager	9.3	10.0
White collar	10.3	10.5
Skilled blue collar	44.8	43.0
Unskilled blue collar	28.0	24.4
Other	7.1	11.8
Number of observations	212,500	256,600

Table 2. Are there careers?*

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Proportion that:						
Left within first year	32.4	24.5	29.3	29.7	39.3	50.4
Stayed a year	15.6	16.0	14.8	16.0	15.4	17.3
Stayed 2-4 years	21.2	25.2	20.9	22.3	18.0	19.2
Stayed 5-9 years	14.3	13.3	13.9	11.6	11.0	6.0
Stayed 10 years or more	16.5	21.0	21.1	20.3	16.3	7.1
Average age of new hires	46.9	36.9	36.0	29.7	31.0	23.5
Average years of schooling	11.9	14.3	12.2	11.5	9.5	10.0
Average number of hires per firm	1.5	11.2	11.2	65.2	48.1	37.3

* The numbers in the table are computed for the employees who were hired from outside the sample firms during years 1981-85

Table 3. Ordered logit estimates of 5-year career share quartiles

Explanatory variable	**Coeffic.**	**St. error**
Average firm size 1980-95	0.00014	0.00005
Average employment growth	7.92	1.50
Industry*:		
Agriculture	-31.88	45.36
Utilities	2.96	0.23
Construction	-1.99	0.21
Trade, hotels, restaurants	-0.36	0.30
Transport and communications	0.56	0.88
Financial services	1.62	0.12
Other services	1.43	3.58
N = 222		
Pseudo R^2 = 0.11		

*. Omitted category: manufacturing

Table 4. Firms' promotion rates*

	Mean rate	**First quartile**	**Median**	**Third quartile**
All job levels	0.132	0.086	0.116	0.158
Level 1	0.318	0.143	0.286	0.500
Level 2	0.348	0.250	0.333	0.419
Level 3	0.358	0.283	0.351	0.429
Level 4	0.135	0.094	0.126	0.165
Level 5	0.047	0.019	0.035	0.061

*. For definition of promotion rate, see text

Table 5. Ordered logit estimates of firms' promotion rate quartiles*

	To all job levels	**To job level 1**	**To job level 2**	**To job level 3**	**To job level 4**	**To job level 5**
Average	0.0002	-0.0000	0.0001	0.0001	0.0001	0.0001
firm size	(0.0001)	(0.0000)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Av. em-	-0.914	-3.028	-7.505	-11.05	-7.707	-2.908
ployment	(0.318)	(3.362)	(3.649)	(3.681)	(3.468)	(3.413)
growth						
Industry:						
Utilities	2.386	0.0500	-0.315	0.513	1.491	1.151
	(0.683)	(0.615)	(0.607)	(0.659)	(0.615)	(0.638)
Construc-	-3.188	-1.226	-2.250	-1.675	-3.504	-1.793
tion	(1.079)	(0.558)	(0.801)	(0.635)	(0.705)	(0.688)
Trade, etc.	1.398	0.530	1.229	-0.293	0.115	1.211
	(0.340)	(0.328)	(0.335)	(0.316)	(0.321)	(0.332)
Transport	1.386	0.783	1.307	0.845	0.240	0.191
	(0.686)	(0.680)	(0.792)	(0.773)	(0.639)	(0.667)
Financial	2.255	0.838	1.028	0.109	0.181	2.159
services	(0.466)	(0.436)	(0.426)	(0.418)	(0.399)	(0.448)
Other	0.578	-0.507	1.276	-0.682	0.590	1.870
services	(0.607)	(0.618)	(0.637)	(0.623)	(0.619)	(0.623)
Pseudo R^2	0.134	0.026	0.080	0.046	0.084	0.090

*. Standard errors in parentheses

Table 6. Incumbents and outsiders compared

	Incumbents	**Outsiders**
Individual characteristics (average for 1981-85):		
Age	34.7	31.2
Years of education	13.1	13.6
Gender: males	44.7	51.2
Hourly wage	89.8	81.7
Subsequent career:		
Hourly wage of those staying in the firm:		
3 years later	117.7	114.9
5 years later	134.6	131.0
10 years later	168.9	167.7
Proportion that have *left the firm*:		
After 3 years	37.9	57.2
After 5 years	48.1	67.0
After 10 years	71.6	80.4
Proportion *promoted again*:		
After 3 years	3.2	3.2
After 5 years	4.9	4.5
After 10 years	8.7	7.1

Table 7. Multinominal logit estimations of subsequent career mobility*

	Stay, not promoted after 3 years	**Promoted, after 3 years**	**Stay, not promoted after 5 years**	**Promoted, after 5 years**	**Stay, not promoted 10 years**	**Promoted after 10 years**
Age	-0.028	0.049	0.021	0.033	-0.0005	0.039
	(0.002)	(0.027)	(0.002)	(0.026)	(0.002)	(0.028)
Education	-0.042	-0.005	-0.038	0.065	-0.041	0.311
years	(0.007)	(0.120)	(0.007)	(0.125)	(0.008)	(0.158)
Female	0.209	-1.354	0.243		0.398	
	(0.035)	(1.041)	(0.035)		(0.040)	
Size of	0.083	0.091	0.078	0.268	0.136	0.643
firm	(0.016)	(0.452)	(0.016)	(0.426)	(0.017)	(0.408)
Incumbent	0.649	-0.343	0.654	0.234	0.551	0.720
	(0.035)	(0.572)	(0.036)	(0.670)	(0.044)	(0.871)
Year of promotion						
1982	-0.337	1.280	-0.148	1.082	-0.204	0.625
	(0.052)	(1.123)	(0.050)	(0.822)	(0.058)	(0.876)
1983	-0.446	1.156	-0.201	0.511	-0.242	-0.057
	(0.053)	(1.122)	(0.051)	(0.876)	(0.060)	(1.011)
1984	-0.613	0.942	-0.300	-0.467	-0.300	0.077
	(0.051)	(1.099)	(0.050)	(1.000)	(0.059)	(0.919)
1985	-0.453	0.117	-0.349	-0.509	-0.184	
	(0.052)	(1.229)	(0.051)	(1.000)	(0.059)	
Pseudo R^2	0.063		0.046		0.035	
N of obs	17,476		17,476		17,476	

* All estimations include industry dummies which to save space are not reported

Table 8. Wage growth equations for stayers*

Independent variables:	**Δ ln W(t) - Δ ln W(t+5)**	**Δ ln W(t) - Δ ln W(t+10)**
Age	-0.008	-0.011
	(0.0002)	(0.0003)
Years of education	-0.012	-0.010
	(0.001)	(0.001)
Male	0.021	0.013
	(0.004)	(0.006)
Size of firm	0.036	-0.059
	(0.004)	(0.007)
Incumbent and further	-0.026	-0.026
promoted	(0.011)	(0.010)
Incumbent, not promoted	-0.062	-0.063
	(0.005)	(0.006)
Outsider and promoted	0.061	0.010
further	(0.026)	(0.024)
R^2 (adj.)	0.083	0.143
Number of observations	26,515	14,750

*. Industry and promotion year dummies are included but not reported.

Table 9. Wage equation estimations*

	1	**2**	**3**	**4**	**5**	**6**
Firm fixed effects	yes	yes	Yes	no	no	No
Individual fixed eff.	no	no	No	yes	yes	Yes
Male	0.184 (0.0003)		0.147 (0.0003)			
Age	0.060 (0.0004)		0.052 (0.0001)	0.103 (0.0001)		0.102 (0.0001)
$Age^2/100$	-0.063 (0.0001)		-0.056 (0.0001)	-0.052 (0.00001)		-0.051 (0.00001)
Years of schooling	0.038 (0.0001)		0.028 (0.0001)	0.054 (0.001)		-0.052 (0.0002)
Tenure in firm	0.004 (0.00003)		0.005 (0.00003)	0.001 (0.00001)		0.001 (0.0007)
Job levels:						
1		reference category	reference category		reference category	reference category
2		-0.263 (0.003)	-0.288 (0.002)		-0.068 (0.004)	-0.070 (0.003)
3		-0.478 (0.003)	-0.448 (0.002)		-0.098 (0.004)	-0.093 (0.003)
4		-0.714 (0.003)	-0.570 (0.002)		-0 163 (0.004)	-0.135 (0.003)
5		-0.679 (0.003)	-0.487 (0.002)		-0.134 (0.004)	-0.089 (0.004)
6		-1.057 (0.003)	-0.668 (0.002)		-0.262 (0.004)	-0.154 (0.004)
R^2 adj.	0.618	0.549	0.654	0.869	0.856	0.869
N of obs	3,755496					
N of firms	222					

*. All estimations include 15 year dummies

Table 10. Wage equation estimations with unemployment and promotion rate interactions*

Independent variables	**1**	**2**
Unemployment rate	-0.017	-0.015
	(0.0002)	(0.0001)
Q1 (highest promotion rate quintile)	0.162	0.104
	(0.004)	(0.003)
Q2	0.127	0.083
	(0.004)	(0.002)
Q3	0.104	0.060
	(0.003)	(0.002)
Q4	0.062	0.050
	(0.004)	(0.002)
Q5 (lowest quintile)	reference category	reference category
Unemployment x Q1	-0.014	-0.008
	(0.0004)	(0.0002)
Unemployment x Q2	-0.011	-0.007
	(0.0003)	(0.0002)
Unemployment x Q3	-0.010	-0.006
	(0.0003)	(0.0002)
Unemployment x Q4	-0.005	-0.004
	(0.0003)	(0.0002)
Firm fixed effects	yes	no
Individual fixed effects	no	yes
N of observations	3,542483	3,542483
R^2 (adj.)	0.628	0.854

*. Other regressors included are the same as in columns 3 and 6 of Table 9, save the year save the dummies, which have been replaced a time trend. The standard errors to the unemployment rate and its interactions are corrected for the fact that they are aggregated at a higher level than the dependent variable.

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