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Reija Lilja

CAREER MOBILITY

IN FINNISH INDUSTRY

ABSTRACT: This paper analyses career mobility among two groups of white-collar workers; clerical and technical employees. A panel data set of employees covering the years 1980-1994 and collected by the Confederation of Finnish Industry and Employers is used as a basis for empirical analyses. Our findings show that promotion rates are much higher than demotion rates. Exit rates decline significantly with tenure. The results imply that there is a learning process which improves the match between employees' skills and firms' job requirements over time. Initial job level, starting salary, education, gender, and the phase of the business cycle appear to be important explanatory factors for career mobility. If an employee changes workplace his or her promotion rate is twice as high as it is for an otherwise similar employee who has not made this move.

Key words: internal labour markets, career mobility

TIIVISTELMÄ: Tutkimuksessa tarkastellaan kahden toimihenkilöryhmän, teollisuustoimihenkilöiden ja teknisten toimihenkilöiden, urakehitystä. Empiiristen analyysien pohjana käytetään Teollisuuden ja Työnantajain Keskusliiton (TT) palkka-aineistosta kerättyä toimihenkilöaineistoa vuosilta 1980-1994. Tuloksista ilmenee, että toimihenkilöiden todennäköisyys saada urallaan ylennyksiä on huomattavasti suurempi kuin vastaava todennäköisyys joutua alennetuksi. Työuran jatkuessa alttius siirtyä toimialan ulkopuolelle vähenee. Tulokset viittaavat siihen, että työuran aikana yrityksissä opitaan yhä paremmin sovittamaan yhteen yritysten tarpeet ja toimihenkilöiden sopivuus eri tehtäviin. Tehtävien vaativuustaso aloitustilanteessa, alkupalkka, koulutus, sukupuoli ja suhdannetilanne vaikuttavat kukin merkittävällä tavalla toimihenkilöiden uralla etenemiseen. Jos uralla etenemiseen on liittynyt työpaikan vaihto (TT:n jäsenyritysten sisällä) toimihenkilön ylennystodennäköisyys on kaksinkertainen samassa paikassa pysyneeseen toimihenkilöön nähden.

Avainsanat: sisäiset työmarkkinat, urakehitys

Summary

In this paper we study career mobility among two groups of industrial white-collar workers; clerical and technical employees. In subsequent empirical analyses we use the individual-level data base of the Confederation of Finnish Industry and Employers (TT) from which a panel data set of new recruits was collected over the period 1980-1985. Information on each recruit is gathered for a period of ten years or (if less than this) for as long as he or she is present in the TT sample.

The centralised wage agreements of the two employee groups involve job classifications which specify how demanding different jobs are. Career mobility is tracked down by changes in these job categories over time. A job can be terminated by three main causes; promotions, demotions or exits. Our results suggest that for a typical clerical employee promotion rate varies around 11 per cent. After two years of employment the promotion probability is the highest, about 16 per cent. Due to smaller number of job categories the promotion rate is lower than this, about 8 per cent, for a typical technical employee. Each year less than one per cent of employees are demoted.

Exit rates decline significantly with tenure suggesting that there is a learning process in firms leading to better job matches at longer tenures. After the first year of employment about every fifth employee exits from the industry. Among those who had been employed for eight years the exit rate is half of this.

If an employee changes workplace (within TT member firms) his or her promotion rate is twice as high as it is for an otherwise similar employee who stays in the same place of work. On the other hand, changing work also involves higher than average risk of demotions for both employee groups. The promotion rates are significantly higher in less demanding job categories than in demanding jobs suggesting that at more advanced levels the limited number of vacancies restrict promotion possibilities .

Human capital investments are quite important for career progress. Employees with higher education have about twice as high rates of promotion as those with basic education only, who also run a higher than average risk of demotions.

Further, the business cycle has a significant effect on the promotion and exit rates. Our results suggest that the period of steady growth in the economy boosts both internal and external mobility. During the years of steady growth (1980-1984) the promotion and exit rates were higher than during the period of accelerating growth (1985-1989) and the slump (1990-1994).

It appears that the promotion propensity is much lower for the gender that represents minority in his or her own employee group. Among clerical employees it is more difficult for a newly recruited man and among technical employees for a woman to obtain promotion than for their otherwise similar colleagues who represent the sex that is in majority in these groups.

Yhteenveto

Tässä tutkimuksessa tarkastellaan kahden teollisuuden toimihenkilöryhmän, teknisten toimihenkilöiden ja teollisuustoimihenkilöiden, urakehitystä. Empiirisissä analyyseissä käytetään Teollisuuden ja Työnantajain Keskusliiton (TT) palkka-aineistosta poimittua otosta vuosina 1980-1985 rekrytoiduista uusista toimihenkilöistä. Kutakin toimihenkilöä on seurattu kymmenen vuotta rekrytoinnin jälkeen tai vähintään niin kauan kuin hän on mukana TT:n aineistossa.

Kummassakin toimihenkilöryhmässä eri tehtävien vaativuustasot on määritelty keskitetyissä työehtosopimuksissa. Tässä tutkimuksessa urakehitystä on seurattu juuri näissä tehtävien vaativuustasoissa tapahtuneiden muutosten avulla. Toimihenkilön tilanne voi muuttua periaatteessa kolmesta syystä. Hän voi saada ylennyksen vaativampiin tehtäviin, hänet voidaan siirtää vähemmän vaativiin tehtäviin tai hän voi siirtyä toimialan ulkopuolelle. Saatujen tulosten mukaan tyypillisen teollisuustoimihenkilön todennäköisyys saada ylennys urallaan vaihtelee 11 prosentin tuntumassa uran eri vaiheissa. Kaksi vuotta työskennelleiden keskuudessa ylennysalttius on suurin, noin 16 prosenttia. Tehtävien vaativuustasojen pienemmän määrän vuoksi tyypillisen teknisen toimihenkilön todennäköisyys saada ylennys vaativampiin tehtäviin on teollisuustoimihenkilöitä alempi, keskimäärin noin 8 prosenttia uran eri vaiheissa. Joka vuosi alle prosentti toimihenkilöistä siirretään vähemmän vaativiin tehtäviin.

Alttius siirtyä toimialan ulkopuolelle laskee selvästi uran pitkittyessä. Näyttäisi siis siltä, että yrityksissä opitaan vuosien varrella sovittamaan paremmin yhteen yritysten tarpeet ja toimihenkilöiden sopivuus eri tehtäviin. Ensimmäisen vuoden jälkeen joka viides uusista toimihenkilöistä jättää toimialan. Kahdeksan vuotta alalla työskennelleiden keskuudessa alttius siirtyä toimialan ulkopuolelle on puolet tästä.

Jos toimihenkilö vaihtaa työpaikkaa (TT:n jäsenyritysten sisällä) hänen ylennystodennäköisyytensä on kaksinkertainen samassa työpaikassa pysyneeseen nähden. Toisaalta työpaikan vaihto pitää sisällään myös selvästi keskimääräistä suuremman riskin joutua vähemmän vaativiin tehtäviin. Ylennystodennäköisyys on vähiten vaativissa tehtävissä

selvästi muita korkeampi. Vaativissa tehtävissä avoimien tehtävien rajoitettu määrä rajoittaa toimihenkilöiden ylennysmahdollisuuksia.

Koulutus on tärkeä urakehityksen kannalta. Korkeakoulututkinnon suorittaneilla on kaksinkertainen todennäköisyys saada ylennyksiä ainoastaan peruskoulun käyneeseen nähden. Peruskoulun käyneellä on myös muita suurempi todennäköisyys joutua vähemmän vaativiin tehtäviin.

Suhdannevaiheella on selvä vaikutus sekä ylennystodennäköisyyksiin että alttiuteen siirtyä toimialan ulkopuolelle. Tutkimuksen tulokset osoittavat että tasaisen taloudellisen kasvun kausi on suotuisaa aikaa sekä sisäisen että ulkoisen liikkuvuuden kannalta. Tasaisen kasvun aikana (1980-1984) sekä toimihenkilöiden ylennysalttius että todennäköisyys siirtyä toimialan ulkopuolelle olivat korkeammat kuin kiihtyneen kasvun (1985-1989) ja laman (1990-1994) aikana.

Tutkimuksessa ilmenee, että todennäköisyys saada ylennys on keskimääräistä alempi sukupuolelle, joka omassa ryhmässään on vähemmistönä. Teollisuustoimihenkilöksi rekrytoidulla miehellä ja tekniseksi toimihenkilöksi rekrytoidulla naisella on vaikeampaa saada ylennys kuin muutoin saman taustan mutta enemmistöä edustavan sukupuolen omaavalla työtoverillaan.

1.   Introduction[1]

There are many theories on the functioning of internal markets of firms but very few facts to support them.[2] The purpose of this paper is to provide new empirical evidence on the functioning of internal labour markets using a panel data set on two groups of Finnish industrial white-collar workers; clerical and technical employees. Our data base is collected from a number of firms over a period of 15 years and the sample is representative in manufacturing sector. In this respect the present study provides a more general basis for the empirical analyses and conclusions than previously reported case studies on single firms.

We focus on some important questions that are normally ignored in traditional labour market literature. These questions are of the following type. Are there "ports of entry" into the firms? What are the characteristics of employees who are more likely to be promoted from one job to another than the others? How do those employees who have a high propensity of demotions and exits from the internal labour market differ from the others?

A semiparametric competing risks model is used in empirical estimations to study how after recruitment different background factors affect the duration of the initial job category. The job spell is allowed to be terminated by three different causes; promotions, demotions and exits. The advantage of using this model is in its ability to analyse separately both the timing and the type of career shifts.

The paper proceeds as follows. In the next section some basic theoretical models on the functioning of internal labour markets are briefly discussed. In the third section of this paper the data set to be used in empirical analyses is described. In the fourth section the statistical model is introduced. In the fifth section results are discussed and in the final section concluding remarks are made.

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[2]   See e.g. Baker and Holmström (1995) and Lazear (1995) for further disucssion.

2. Theoretical background

The concept of internal labour markets of firms is well accepted in economic theory. The difference between *internal* and *external* labour markets comes from the feature that in internal labour markets pricing and allocation of labour is governed by *administrative* rules rather than by *economic* mechanisms that govern external labour markets.[3] There are many hypotheses about these internal rules and in this section we will discuss some of them in more detail.[4]

The human capital theory provides primarily a supply-side approach to internal labour markets stressing the importance of personal skills and ability, and hence education, in wage formation and career progress. The model assumes that markets are *competitive* and that good advancement opportunity exists for all those who are willing (and able) to make proper human capital investments. Thus, the main conditions surrounding a particular job-person match are *flexible*; different types of careers should mainly be caused by differences in human capital investments. The model suggests that in order to maximise their benefits individuals concentrate their human capital investments in the early part of their careers. Under imperfect competition this framework predicts that the probability of promotions should equal that of demotions.[5]

Existing theories of *internal labour markets*, on the other hand, focus on *jobs* in which workers are employed. For instance, Doering and Piore (1971) suggest that internal labour markets are characterised by *fixed ports of entry and exit* and established procedures of hiring, firing, and promoting. Promotions are primarily determined by on-the-job training. Due to this *entry jobs* are extremely important for career mobility because they lead into predetermined progression systems.

In a model developed by Thurow (1975) it is assumed that the firing rules of the firms are strict and that therefore employment and wages are *inflexible* in the short run. There is a close link between the type of the job and salary level which leads to the situation in which the

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[3]   Doeringer and Piore (1971).

[4]   See Baker and Holmström (1995) for further discussion.

[5]   Tuma (1985).

competition between employees is about attaining certain *jobs* rather than about wages. Because of this competition one would in most cases observe a change in jobs only when it is beneficial to the employee. In other terms, this model predicts that the *probability of promotions* is much *higher* than that of demotions. Further, because the most demanding jobs require most advanced skills people will be selected into different jobs in terms of their *trainability*. This means that people with good educational and professional background and who start in demanding jobs have better than average career paths.

Sørensen' (1977) assumes, on the other hand, that rather than competing for jobs people *compete for vacancies* in jobs with highest rewards. People entering the labour market are assumed to be randomly distributed among jobs according to each one's level of acquired resources. Employment is assumed to be *inflexible* and workers have to wait for an opportunity to move to a better job. The demotion rate is practically zero. The rate at which vacancies in better jobs occur affect the promotion probability. Therefore, under vacancy competition the *promotion rate* is *lower* than average in *demanding jobs* for which there are less available vacancies.

Rosenbaum's (1984) *tournament model* defines a career selection system as a series of implicit competitions which progressively differentiate a cohort of employees throughout their careers. The model suggests that selections among the members of the cohort occur continually. This means that employees' careers differ both in their timetables for advancement and in their rates of advancements. The tournament model explains how careers progress in the firm. In this framework *firms can learn* about employees' abilities during their careers and act accordingly. If this is the case one would, for example, observe exit rates to decline with tenure when the match between employees' human capital and firms' job requirements improves.[6]

We have highlighted above some basic approaches which explain career mobility in firms. In the subsequent sections of this paper our intention is to investigate how the *different* factors, on which the above models focus, affect career mobility in the internal labour markets of Finnish industrial employees. Doing this we can investigate which theories (if any) gain support from our data.

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[6]   Jovanovic (1979).

3. Data

Empirical investigation of career patterns requires a panel data set in which the same individuals are followed over several years. In this study the panel data set collected by the Confederation of Finnish Industry and Employers (TT) during the period 1980-1994 is used as a basis for statistical analyses. TT gathers information on all employees in its member companies. About 75 per cent of private-sector manufacturing companies belong to the confederation whereas only a minor part of companies in construction and services do so. Thus, the TT data set is representative in *manufacturing sector* only.

Two groups of *white-collar workers*, clerical and technical, are studied separately in subsequent empirical work.[7] The sample consists of those clerical and technical white-collar workers who were new recruits during the period 1980-1985. To collect data over five years (instead of one) and, thus, creating "quasi cohorts" has the advantage of increasing the sample size for empirical analyses. For all recruits follow-up information is gathered for ten years or for as long as they are present in the TT sample (if less than ten years). In this way panel data sets for 1127 clerical and 1009 technical employees were created.

Internal labour markets refer to the industry level i.e. to all member firms of the Confederation of Finnish Industry and Employers. All these member firms follow the *same* centralised wage agreements and are governed by the *same* institutional rules. In this sense TT-member firms form their own internal labour markets with well-defined regulations and practices.

The wage agreements of the two employee groups involve *job classifications* which specify how demanding different jobs are. For clerical employees jobs are classified into twelve job requirement levels whereas for technical employees jobs are classified into six different wage groups. *Career mobility* is tracked down by changes in different individuals' job levels (wage groups). In subsequent analyses the basic case refers to a job shift *within the same workplace*. The possibility that a person may have changed workplace (among TT-member firms) at the same time as the career shift has occurred will be controlled for by an appropriate indicator

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[7]   White-collar workers are divided into three groups in this data set; clerical, technical and upper-level employees. The two groups have been chosen for closer scrutiny due to the job classification system that these groups have.

variable in estimations.[8] To characterise the data sample means of some central variables are presented in Table 1.

Table 1. Sample means of variables

Variables	Clerical employees N=1127	Technical employees N=1009
Personal background		
Share of women	74.89 %	16.75 %
Age	27.90	29.48
Education		
Basic	26.27 %	11.70 %
Secondary	64.06 %	70.86 %
Higher	9.67 %	17.44 %
Job level		
Level 1A-1C	12.16 %	
Level 2A	16.24 %	
Level 2B	19.88 %	
Level 2C	18.81 %	
Level 3A	13.13 %	
Level 3B	11.80 %	
Level 3C	5.94 %	
Level 4A-4C	2.04 %	
Wage group		
Group 1		7.73 %
Group 2		18.83 %
Group 3		29.14 %
Group 4		30.03 %
Group 5		12.88 %
Group 6		1.39 %
Change of workplace	28.56 %	26.82 %
Job duration (in years)	2.47	2.69

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[8] Change of workplace in our data set is reported at a factory level. Different factories may or may not belong to the same firm. Employment changes at the firm level are available for the few last years in our data set.

Table 1 shows that the two sample groups have very different gender structures; about 75 per cent of *clerical* employees are *women* whereas about 83 per cent of *technical* employees are *men*. At recruitment clerical employees are slightly younger than technical employees the average recruitment age being 28 for clerical and 29.5 for technical employees.

The employees appear to be quite skilled, less than 27 per cent of clerical and 12 per cent of technical employees have basic education only.[9] The majority of employees (64-71 per cent) have secondary education and 10-17 per cent have higher education. These figures reflect the various skills that in each group are needed for different tasks.

In the centralised wage agreements of clerical employees the job levels are divided into four main categories (1-4) and three subcategories (A-C). The least demanding job category is 1A and the most demanding is 4C. The three lowest levels 1A-1C and the three highest levels 4A-4C are combined to allow for enough observations. The jobs for technical employees are grouped into six wage categories. The least demanding jobs belong to the wage group 1 and the most demanding to group 6.

It appears from Table 1 that there are *no clear ports of entry*, firms have recruited new employees to all job categories and differences in the shares of recruits in these categories reflect the relative size of the job levels. In this sense the internal labour market theory which suggests the existence of special ports of entry (and exit) is not supported by our data. This is also in accordance with the results reported in Baker, Gibbs and Holmström (1994).

On average, 27-29 per cent of employees who remain working within TT-member firms change workplace every year. This rate of external mobility is 7-9 percentage points higher among new recruits than among industrial employees on average. According to Table 1 a new recruit stays at the *initial job category* for about 2.5-2.7 years, on average.

The job level (or wage group) can change for three main reasons. First, an employee may be *promoted* to a higher and more demanding job. Second, he or she may be *demoted* to a less

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[9]   These figures include those employees whose level of education was not specified in the data. Among clerical employees 2.49 per cent and among technical employees 2.18 per cent of employees belonged to this category.

demanding job. Third, a person may *exit* from the TT data set because he or she becomes unemployed, receives employment from a non-member firm or leaves the labour market altogether.[10] In Table 2 the average transition rates for these different changes are reported.

Table 2. Average transition rates

Change in status	Clerical employees %	Technical employees %
Promotion	32.28	43.22
Demotion	2.93	2.97
Exit	58.04	47.17
No change	3.02	5.25

Table 2 shows that about 32 per cent of clerical employees were promoted to a higher job category at some stage during the follow-up period, about three per cent were demoted and 58 per cent left the TT member firm before any change in the status managed to happen. Three per cent of clerical employees stayed in their first job level throughout the follow-up period (i.e. for ten years). Further, about 43 per cent of technical employees were promoted during the follow-up period, about three per cent were demoted and 47 per cent left the TT member firm before any change in the wage group occurred. Five per cent of technical employees stayed in their initial wage group for the whole follow-up period of ten years. All in all, according to Table 2 clerical and technical employees show quite a remarkable internal and external mobility over the ten years they were followed.

The average transition rates in Table 2 are revealing but they do not exhibit the time pattern of the career shifts. We will study this pattern using an econometric model for job transitions which allows yearly transition rates to be determined freely by the data. Let us specify this model in the next section.

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[10] Unfortunately, there is no way to separate these different causes of exit from the TT data set. There is also a small number of employees for whom the job level changed for other reasons than those mentioned above. This happened for 3.73 per cent of clerical employees and for 1.39 per cent of technical employees. These changes occur, for example, when a clerical employee becomes a technical employee and vice versa, and when some of the employers do not report their job categories in all years.

4. Method of estimation

To allow for the fact that the spell in the initial job category can terminate either due to promotion, demotion or exit a semiparametric competing risks model is specified for empirical estimations. The model has the advantage that it is able to analyse separately both the timing and the type of career shifts. Due to these advantages dynamic analyses are recommended when event-history data such as ours are used.[11]

First, let us denote by D the length of an individual's completed spell in a particular job category. Further, let us assume that there are K different causes (failure types) which can terminate the job spell. The probability that a spell in a particular job is completed by time t+s due to a failure type k, given that the job spell was still continuing at time t, will be defined by the following discrete-time proportional hazards model $h^k(t)$:[12]

$$(1) \quad h^k(t) = P(D < t+s \mid D \geq t) =$$

$$1 - \exp\left\{-\exp[x(t)'\beta] \int_t^{t+s} h_0^k(u)du\right\},$$

where $h_0^k(t)$ is the so called baseline hazard for the failure type k at time t, x(t) is a vector of explanatory factors (covariates) and β is a vector of unknown parameters. The model can be further written as follows:

$$(2) \quad h^k(t) = 1 - \exp\{-\exp[x(t)'\beta] + \gamma^k(t)\}, \quad \text{where}$$

$$(3) \quad \gamma^k(t) = \ln\left[\int_t^{t+s} h_0^k(u)du\right].$$

The hazard function (2) allows consistent estimation of β parameters without the need to specify the form of the baseline hazard function. Let us assume that the cause-specific hazards $h^k(t)$ are mutually independent and that the conditional probability that a spell is completed by time t+s by any of the failure types is

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[11] See Tuma and Hannan (1979).

[12] See Meyer (1990) for further discussion on the properties of this model.

$$(4) \quad h(t) = \sum_{k=1}^{K} h^k(t).$$

The log-likelihood component for an observed duration d can be written as follows:

$$(5) \quad \ln(l) = c \ln [h^k(d)] + \sum_{t=1}^{d-1} \{ \sum_{j=1}^{K} \ln[1 - h^j(t)] \},$$

where c is an indicator variable equal to one if the observed spell is completed due to a failure type k and equal to zero if it is censored (uncompleted). According to equation (5) the log-likelihood contribution of each person can be partitioned into separate terms which are functions of single cause-specific hazard functions. This means that it is possible to estimate hazard model parameters for any given failure type separately by treating duration terminated by other failure types as censored at the point of termination.

In subsequent empirical analyses the hazard models for three different failure types, promotions, demotions and exits from the data base, are estimated. Further, for promotions and exits the TT panel data set allows us to specify *nine* different baseline hazards $\gamma^k(1),...,$ $\gamma^k(9)$ each representing a duration of the length of one year (t=1,2,...,9 and s=1). These parameter estimates specify the *time pattern* of conditional probabilities for these two failure types. A more simplified time pattern (i.e. $\gamma^k(1)=\gamma^k(2)=...=\gamma^k(9)$) must be assumed for demotions due to the small number of observations for this failure type.

5. Results

Let us first study career mobility of *clerical employees*. In Table 3 hazard model estimates for the three failure types (promotions, demotions and exits) are reported for this employee group. The explanatory variables that have been chosen reflect both theoretical considerations as well as practical possibilities available in the data set.

An indicator variable which tracks down the *change of workplace* is formed for each year and is used as a time-variant covariate in subsequent estimations. Differences in *personal*

Table 3. Hazard model estimates, clerical employees

Explanatory variables	Promotions	Demotions	Exits
Baseline constants			
Period [1,2[	-2.0287 (-13.06)	--	-1.4335 (-12.74)
Period [2,3[	-1.7579*(-10.40)	--	-1.5273 (-11.74)
Period [3,4[	-1.8310 (-9.07)	--	-1.5054 (-9.90)
Period [4,5[	-2.1526 (-8.04)	--	-1.7464* (-8.71)
Period [5,6[	-2.0091 (-6.81)	--	-1.6770 (-7.52)
Period [6,7[	-2.3927 (-5.96)	--	-1.6060 (-6.39)
Period [7,8[	-2.5106 (-5.35)	--	-1.7596 (-5.76)
Period [8,9[	-2.1767 (-4.68)	--	-2.2143* (-5.29)
Period [9,10[	-2.1872 (-4.65)	--	-1.8537 (-4.75)
Period [1,10[	--	-4.7584 (-12.61)	--
Change of workplace	0.7448 (4.83)	1.0774 (2.36)	--
Personal background			
Age	-0.0209 (-2.16)	0.0249 (1.02)	-0.0056 (-0.86)
Gender (male=1)	-0.3421 (-2.26)	-0.2812 (-0.67)	0.1055 (1.03)
Job level			
Level 1A-1C	0.5409 (2.48)	--	0.4090 (2.55)
Level 2A	0.6484 (3.65)	-1.8762 (-1.81)	0.2390 (1.68)
Level 2B	0.1383 (0.78)	-2.3768 (-2.29)	0.2443 (1.95)
Level 2C	0.0086 (0.05)	-0.5839 (-1.29)	-0.1268 (-1.02)
Level 4A-4C	--	1.5433 (2.07)	--
Education			
Basic	-0.4884 (-3.39)	1.0507 (2.65)	0.0419 (0.44)
Higher	0.2464 (1.26)	-0.2571 (-0.42)	0.1993 (1.37)
Other characteristics			
Relative starting salary	0.6003 (1.49)	-7.4765 (-4.07)	-0.7263 (-2.34)
Transition year			
1985-1989	-0.3333 (-2.99)	--	-0.2673 (-3.19)
1990-1994	-1.7076 (-4.04)	--	-0.7740 (-3.63)
Log-likelihood	-1061.6547	-154.1220	-1628.3243

t-values are in parentheses. * = statistically significantly different from the first period's baseline constant at 10 per cent significance level.

background are controlled for by age, which is also a time-variant covariate in estimations and a gender indicator for which *women* are the reference group. The job level indicators measure the *required skill levels* of first jobs the reference category being that of *3A-3C*.

The acquired human capital is measured by completed education for which the reference category is *secondary education* (upper and lower vocational education). Further, the *relative starting salary* can be thought to represent initial evaluations that firms make about recruits. It is measured as a share of a person's hourly wage to the mean hourly wage at his or her own job category. Thus this salary reflects, among other things, recruits' unmeasured competence, their signalling ability about their skills as well as negotiation power at recruitment.[13]

Due to the fact that our data represent "quasi cohorts", people have been recruited and their careers have progressed at different phases of a *business cycle*. To control for this we have included transition year indicators for the year at which the job spell was terminated. The reference transition period for the job shift is between *1980-1984*.

The hazard rates that can be calculated from Table 3 are *conditional* probabilities. In other words, at each duration they represent propensities that a transition occurs on the condition that the job has lasted until that duration. The baseline hazard constants reflect the differences in the *time patterns* of these probabilities. Figures 1 and 2 show the calculated baseline hazard rates for promotions and exits for some employee groups. In each figure the *reference group* consists of women who did not change their place of work, who have secondary education, who were recruited to levels 3A-4C, whose career shift occurred during 1980-1984 and whose other characteristics obtain mean values in the sample.

Figure 1 shows that for the reference group the promotion rate fluctuates around 11 per cent. After two years the promotion probability is the highest, those clerical employees who stay at their jobs for at least two years have almost 16 per cent probability of getting promotion. For those who stay in their initial jobs for seven years this probability sinks to eight per cent.

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[13]   Baker and Holmström (1995) report that in their study one decile increase in starting salary increased the chances of promotion by 7.6 per cent.
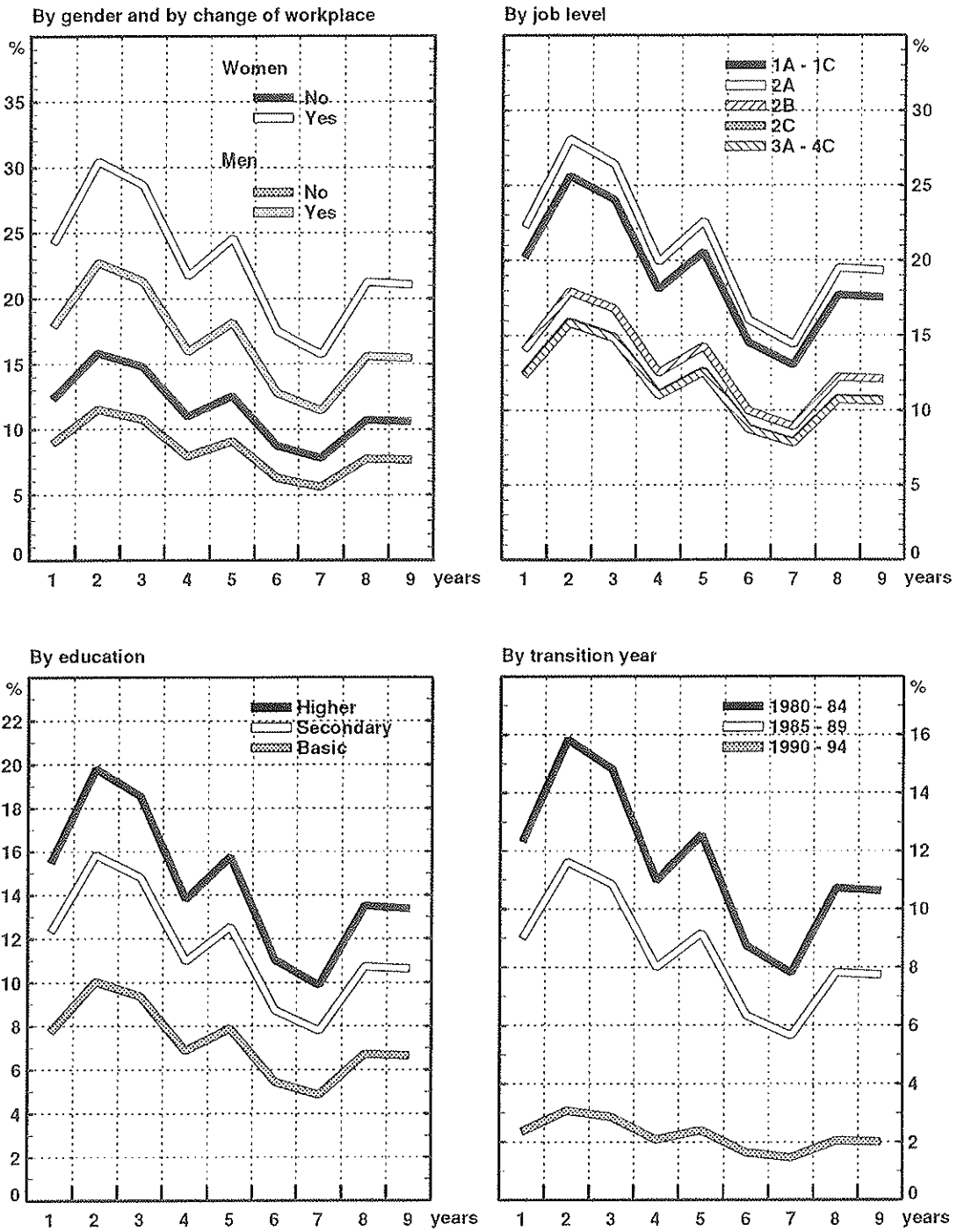
Figure 1. Promotion rates, clerical employees

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Figure 2. Exit rates, clerical employees

By gender

By job level

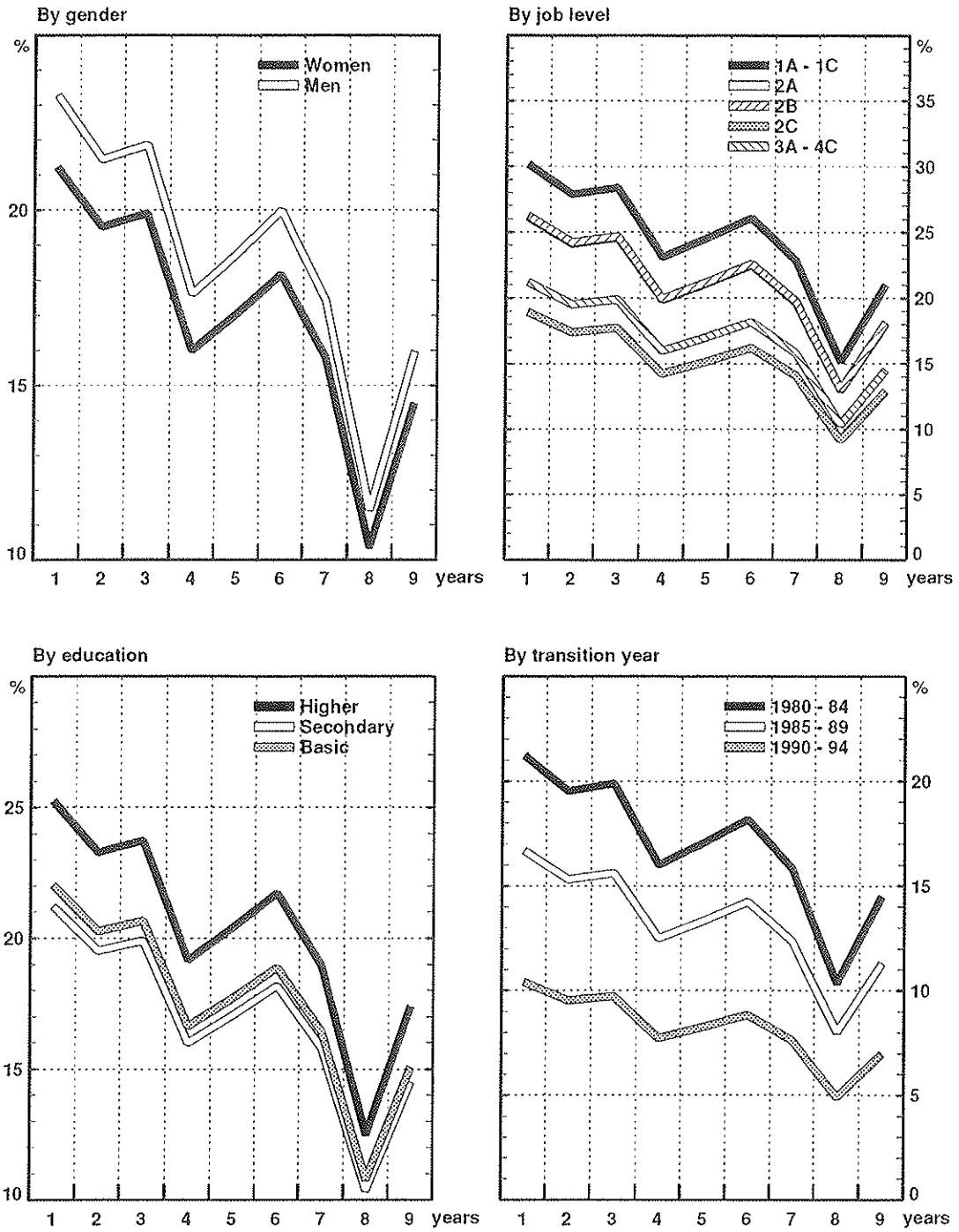By education

By transition year

ETLA

Figure 2 shows the time pattern of exit rates. It appears from Figure 2 that the exit rates decline considerably with the length of stay in TT member firms. After the first year the exit rate is over 20 per cent for the reference group. At eight years the exit rate is as low as 10 per cent. The declining pattern of exit rates suggests that some *learning* about employees' abilities has occurred in TT member firms over the years and has led to these smaller exit rates at later years of the career.[14] There were too few observations for us to allow the demotion rate to vary over time. According to Table 3 the average demotion rate for the reference group is less than one per cent. In a competitive market one would expect promotion and demotion rates to be the same. The large difference between promotion and demotion rates in our data set reflects partly the influence of wage agreements on the determination of job levels and partly the labour-allocating function of firms which cause deviations from the competitive model. This result is similar to that of Baker, Gibbs and Holmström (1994) who studied managerial employees' career progress in a single US firm.

Let us return to other results reported in Table 3. It appears that *change of workplace* increases the probability of *both* promotions *and* demotions. If a clerical employee changes workplace his or her probability of being promoted is *twice as high* as it is for an similar employee who has not experienced this change. The change of workplace has also a strong impact on demotions; among those employees who change their workplaces about 2.5 per cent are demoted whereas for the others demotion rate is less than one. This result implies that changing employment does not always reflect beneficial circumstances for the employees.

Age matters only for promotions. The older recruits have smaller promotion probabilities than otherwise similar younger recruits: ten more years of age leads to two percentage points lower promotion probability. Table 3 also suggests that among female dominated clerical employees it is *more difficult for men* to be promoted than it is for women. Figure 1 shows that the promotion rate is about three percentage points lower for men than for women. This may reflect some administrative practices which have led to fewer clerical vacancies for men (who are in minority) than for women. Maybe due to this men have slightly higher exit rates but the difference between the two sexes is not statistically significant.

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[14]   For further discussion of the learning hypothesis, see Jovanovic (1979).

The *job level* at which the recruitment occurred has a marked influence on different transition probabilities. It appears from Figure 1 that promotion rates are much higher than average in less demanding jobs. A person who is recruited to the lowest job level has, on average, about 19 per cent probability of getting promotion. For those recruited to job levels 3A-4C this probability is 8 percentage points lower. This means that lower level job categories are by no means dead ends for the reference person. This result is, in fact, in accordance with Sørensen's (1977) *vacancy competition model* which suggests that the rate of mobility is smaller in better jobs simply because there are less available vacancies in these jobs. What comes to demotions, it appears that at lower job levels one is less likely to be demoted than at higher job categories. The external mobility is greatest at lower job levels even though the differences are not as apparent as for promotions (Figure 2).

Table 3 shows that *human capital investments* are important for promotions; those clerical employees with basic education only have a smaller promotion probability and a larger demotion probability than their otherwise similar colleagues with secondary or higher education. The average promotion rate for clerical employees with basic education is about seven per cent whereas it is four percentage points higher for those with secondary education and twice as high for those with higher education. For clerical employees with basic education only demotions are almost three times as likely as for the reference group. Table 3 also suggests that the initial evaluation, measured in terms of relative starting salary, matters for career progress. Those employees with higher than average starting salaries are more prone to being promoted and less prone to being demoted or exiting.

Table 3 suggests also that the *business cycle* has a significant effect on the promotion and exit rates. It seems that *steady growth* in the economy is beneficial for both internal and external mobility. During the years of steady growth (1980-1984) the promotion and exit rates were higher than during the period of accelerating growth (1985-1989) and the slump (1990-1994), see Figures 1 and 2.

Let us next study if similar patterns of internal and external mobility among *technical employees* can be found. The hazard model estimates for this group are reported in Table 4.

Table 4. Hazard model estimates, technical employees

Explanatory variables	Promotions		Demotions		Exits	
Baseline constants						
Period [1,2[	-2.5507	(-19.81)	--		-1.6413	(-16.12)
Period [2,3[	-2.2696*	(-16.41)	--		-1.9978*	(-14.89)
Period [3,4[	-2.4757	(-14.03)	--		-1.8681	(-12.23)
Period [4,5[	-2.3005	(-11.73)	--		-2.1276*	(-10.59)
Period [5,6[	-2.4636	(-9.67)	--		-2.3990*	(-8.92)
Period [6,7[	-2.0854*	(-8.52)	--		-2.0314	(-8.07)
Period [7,8[	-2.8502	(-6.91)	--		-2.3389*	(-6.93)
Period [8,9[	-3.3530	(-5.79)	--		-2.1807	(-6.48)
Period [9,10[	-2.6633	(-5.93)	--		-2.1445	(-6.04)
Period [1,10[	--		-5.1939	(-13.93)	--	
Change of workplace	0.5805	(4.72)	1.8710	(5.02)	--	
Personal background						
Age	-0.0307	(-2.99)	-0.0008	(-0.03)	0.0173	(2.16)
Gender (female=1)	-0.6392	(-3.94)	0.7542	(1.23)	-0.0016	(-0.01)
Wage group						
Group 1	1.4367	(6.18)	--		0.6109	(2.70)
Group 2	1.3240	(8.13)	-1.6545	(-1.51)	0.3974	(2.55)
Group 3	0.9867	(7.31)	-1.2441	(-1.62)	0.1163	(0.94)
Group 5	--		1.1128	(2.45)	--	
Group 6	--		2.0032	(2.52)	--	
Education						
Basic	-0.4586	(-2.42)	0.2362	(0.41)	0.0722	(0.52)
Higher	0.3361	(2.78)	-0.0823	(-0.15)	0.1267	(0.97)
Other characteristics						
Relative starting salary	0.7638	(2.08)	-0.9813	(-0.68)	-0.8059	(-2.14)
Transition year						
1985-1989	-0.1581	(-1.55)	--		-0.1716	(-1.76)
1990-1994	-1.1059	(-3.32)	--		-0.6099	(-2.53)
Log-likelihood	-1140.7536		-143.1937		-1300.5975	

t-values are in parentheses. * = statistically significantly different from the first period's baseline constant at 10 per cent significance level.

Figures 3 and 4 show the respective promotion and exit rates for selected groups of technical employees. In each figure the *reference group* consists of men who did not change their place of work, who have secondary education, who were recruited to wage groups 4-6, whose career shift occurred during 1980-1984 and who have mean values in other measured variables.

Let us first discuss the *time pattern* of transition rates given by the baseline hazard constants. It appears from Figure 3 that for the reference group the promotion rate fluctuates around eight per cent during the first years of employment dropping to three per cent after the 8th year. The promotion rates among technical employees are, on average, four percentage points lower than those among clerical employees. This difference can be explained by the fact that there are more promotion ladders among clerical than among technical employees (12 versus 6). The average demotion rate of 0.6 per cent is very low compared with that of promotions. Reasons behind this discrepancy are the same as suggested for clerical employees.

As was the case for clerical employees Figure 4 shows that the exit rates decline considerably over the years for technical employees. It appears that also in this group some *learning* about different employees' abilities occurs leading to better job matches and smaller exit rates at longer tenures.

The *change of workplace* increases the probability of promotions and demotions also among technical employees. If a technical employee changes workplace his or her probability of being promoted is almost *twice as high* as it is for the reference person. A technical employees who changes workplace has more than *ten times as high* probability of being demoted as the others; the demotion rate is about 7.4 per cent in this group. Thus, between the years 1980-1994 changing employment has involved a relatively high risk of demotions for technical employees.

Table 4 suggests that among technical employees *age* affects both promotion and exit rates. The older the person is at recruitment the smaller promotion and the higher exit propensity he or she has than an otherwise similar younger recruit. A technical white-collar worker who is ten years older than average has about two percentage points lower promotion and equally
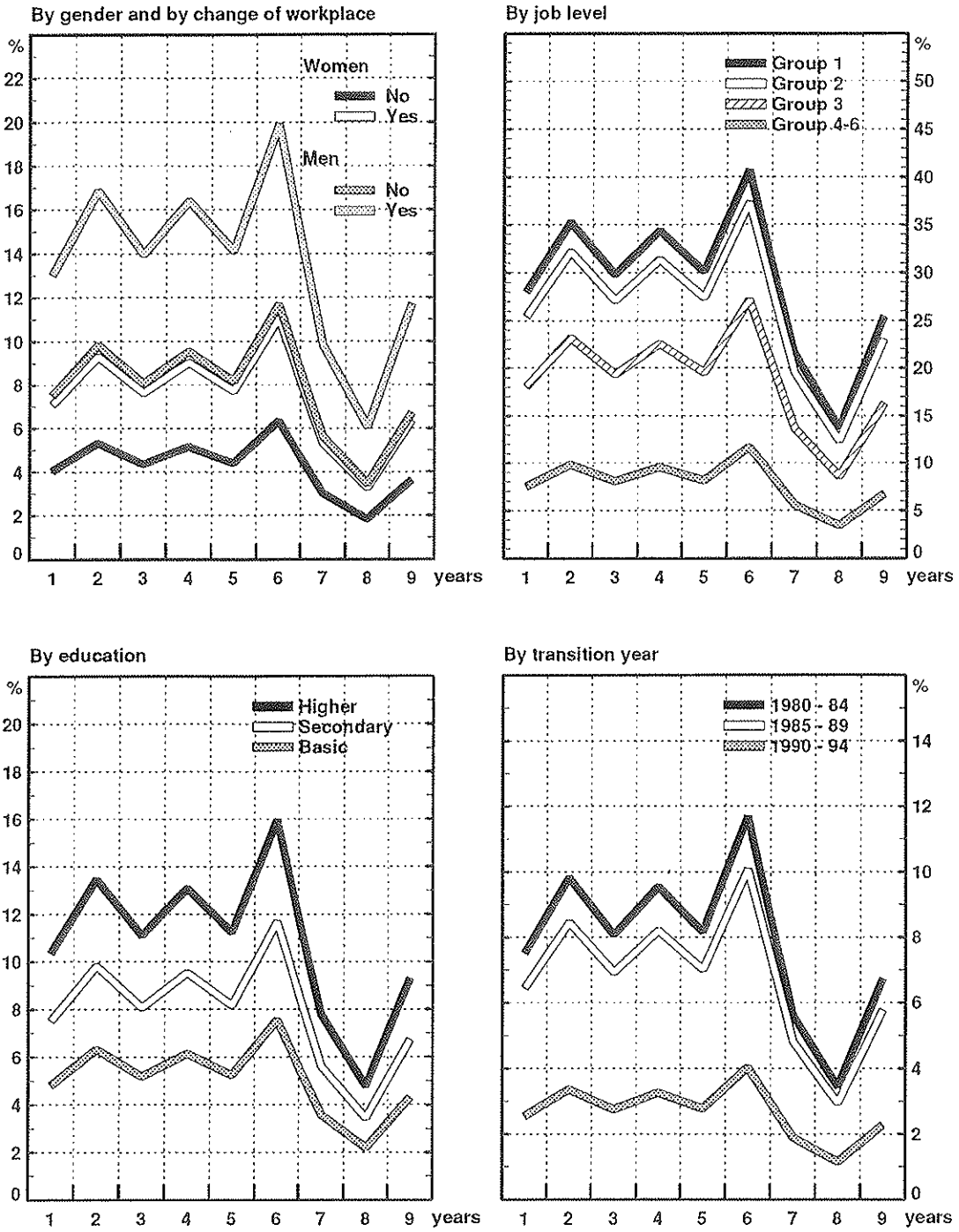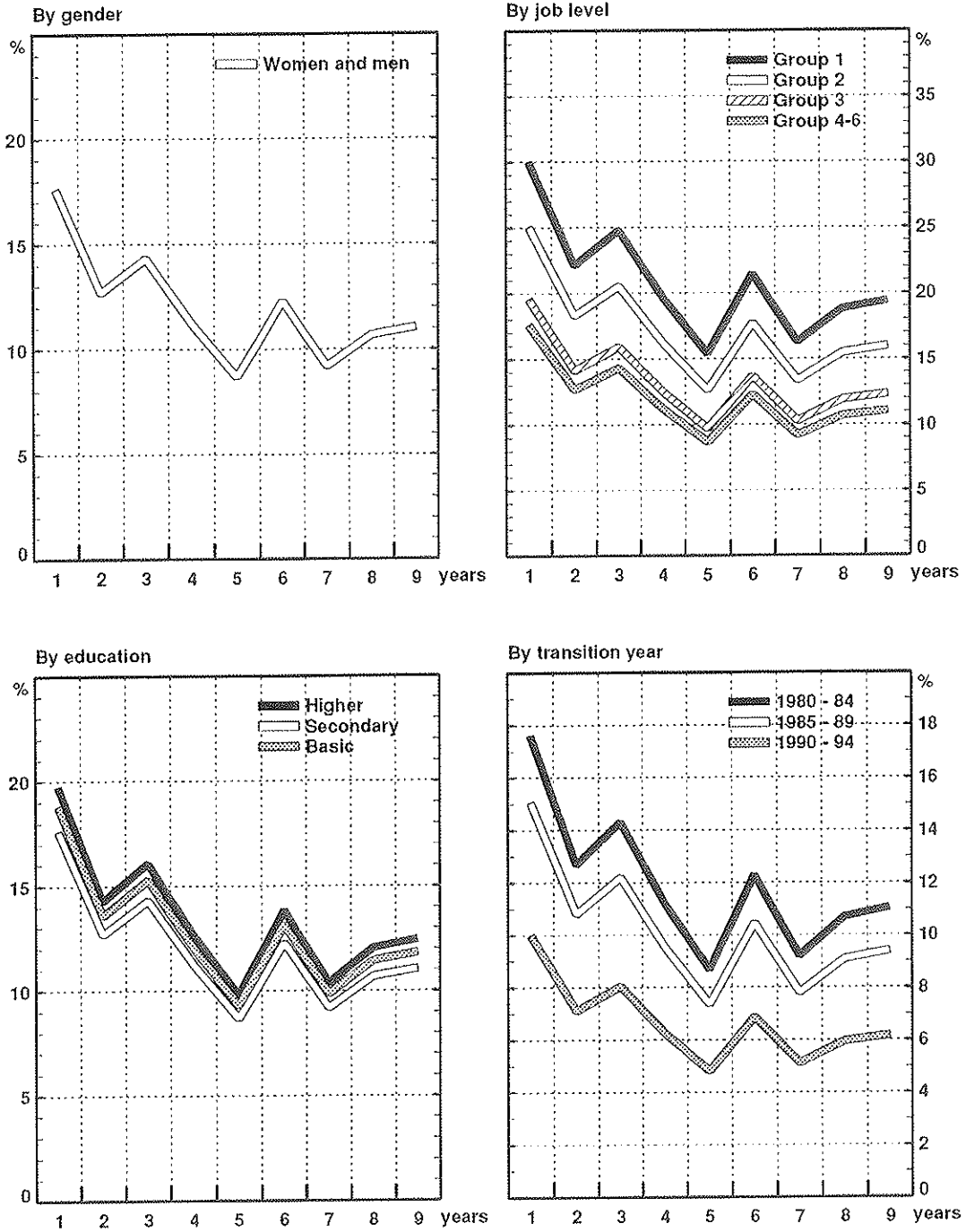
Figure 3. Promotion rates, technical employees

By gender and by change of workplace

By job level

By education

By transition year

Figure 4. Exit rates, technical employees

By gender

By job level

By education

By transition year

ETLA

much higher exit probability than an otherwise similar but younger employee. Thus, it appears that experience does not play very important role in the internal markets of technical employees. Further, as was the case for clerical employees the *gender* has a significant effect on promotions. The promotion rate is considerably lower for women (in minority among technical employees) whose average promotion rate of 4.2 per cent is about half of that of otherwise similar men. This minority gender effect is much higher than it is among clerical employees. It appears, however, that women do not have higher exit rates among technical employees.

As was the case among clerical employees the *job level* at which recruitment occurred has a significant effect on all transition rates. A technical employee who starts his career from the lowest wage group has on average about 29 per cent probability of being promoted at each tenure (Figure 3). For those recruited to groups 4-6 this probability is much lower, on average about eight per cent. Further, it appears that technical employees at lower job levels are less likely to be demoted than those in more demanding jobs. At job level six demotions are over seven times as likely as at the job level four. Exit rates are 1.7 times as high for those technical employees who were recruited to the lowest wage group as they are for those in groups 4-6 (Figure 4).

The *human capital investments* are quite important also for technical employees' promotion possibilities. Those technical employees who have only basic education have, on average, about five per cent probability of promotion each year whereas the corresponding figure for those with secondary education is eight and for those with higher education eleven per cent. Further, Table 4 shows that the initial evaluation, measured in terms of relative starting salary, influences both promotion and exit rates. Technical employees with higher than average starting salaries have a higher propensity of promotions and lower propensity of exits than their otherwise similar colleagues.

The *business cycle* has similar effects on promotion and exit rates for technical employees as for clerical employees. The period of *steady growth* appears to boost both internal and external mobility. During this period the promotion and exit rates were substantially higher than during the period of accelerating growth and the slump.

6.   Concluding remarks

In this paper we have studied internal labour markets of two groups of white-collar workers; clerical and technical employees. In empirical analyses we have used a panel data set collected from a representative sample of manufacturing firms. Our findings suggest that the internal labour markets of these employees function in ways that cannot altogether be understood within a competitive model. Promotion rates are much higher than demotion rates. Exit rates decline significantly with tenure suggesting tha there is a learning process which goes on about different employees' abilities leading to better job matches and smaller exit rates at longer tenures. No clear ports of entry or exit were found.

Our results show that changing workplace increases significantly the probability of promotions and demotions. Job levels are also important to career progress. The promotion rates are lower than average at most demanding job categories suggesting the significant role of available vacancies for career progress. Human capital investments improve career mobility. Further, our results suggest the period of steady growth boosts both internal and external mobility. We also found evidence of some administrative rules that have resulted to differences in career progress among different employee groups. For instance, it appears that among both employee groups the promotion propensity is much lower for the gender that represents minority.

All in all, our results are in many respects surprisingly similar to those presented in earlier studies using personnel records of single US firms only.[15] This suggests that there must be some underlying general mechanisms according to which internal labour markets function no matter the institutional settings which govern firms' behaviour.

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[15]   Baker and Holmström (1995).

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