



KATHOLIEKE  
UNIVERSITEIT  
LEUVEN

# **DEPARTEMENT TOEGEPASTE ECONOMISCHE WETENSCHAPPEN**

**RESEARCH REPORT 0038  
THE RELATIVE IMPORTANCE OF INDIVIDUAL,  
JOB-RELATED AND ORGANISATIONAL  
CHARACTERISTICS IN EXPLAINING  
DIFFERENCES IN EARNINGS**

**by  
L. SELS  
B. OVERLAET  
J. WELKENHUYSEN-GYBELS  
A. GEVERS**

D/2000/2376/38

# WHO EARNS MORE (AND WHY)?

THE RELATIVE IMPORTANCE OF INDIVIDUAL, JOB-RELATED AND ORGANISATIONAL CHARACTERISTICS IN EXPLAINING DIFFERENCES IN EARNINGS

Sels, L., Overlaet, B., Welkenhuysen-Gybels, J. and Gevers, A.

LUC SELS is associate professor at the Department of Applied Economics (Organization Studies) of the Katholieke Universiteit Leuven. His main research focuses on the explanation of differences in training investments between companies, the diffusion of new organization concepts, reward systems and flexibility of work. ([luc.sels@econ.kuleuven.ac.be](mailto:luc.sels@econ.kuleuven.ac.be)).

BERT OVERLAET is associate professor at the Department of Applied Economics (Organization Studies) of the Katholieke Universiteit Leuven. Several of his publications deal with the fairness of wage differences, knowledge networks and change management in organizations. ([bert.overlaet@econ.kuleuven.ac.be](mailto:bert.overlaet@econ.kuleuven.ac.be))

JERRY WELKENHUYSEN-GYBELS is a doctoral candidate of the F.W.O. (the Scientific Research Fund Flanders). He is a member of the Data Collection and Analysis Group of the Department of Sociology (KU Leuven) ([jerry.welkenhuysen@soc.kuleuven.ac.be](mailto:jerry.welkenhuysen@soc.kuleuven.ac.be))

ANN GEVERS is research assistant at the Department of Applied Economics of the KU Leuven. She is a member of the Organization Studies research group. Her research is mainly focused on the fairness and effectiveness of innovative reward systems. ([ann.gevers@econ.kuleuven.ac.be](mailto:ann.gevers@econ.kuleuven.ac.be))

## **Abstract**

This paper focuses on a number of key research questions: (1) What is the relative importance of individual, job-related and organisational characteristics in explaining differences in earnings? (2) Do job characteristics such as hierarchical level and functional domain exercise a significant influence on pay differentials if we control for the traditional human capital factors? (3) Do organisational characteristics such as size and the sector in which the company is active exercise a significant influence on pay differentials if we control for the traditional human capital factors and job-related pay determinants? In order to assess the relative importance of these pay determinants, use is made of linear regression and analysis of variance. The analysis draws on data from the Salary Survey, which generated pay details for a total of more than 15,000 Belgian white-collar workers. Based on the analysis, we come to the conclusion that the five main determinants, in order of importance, are number of years' work experience; level of education; hierarchical level; sector of employment; and the nationality of the parent company. A further striking feature is that more than 50% of the total explained variance can be attributed to the three features which receive a great deal of attention in traditional human capital approaches to pay differentials: level of education, work experience and gender.

# WHO EARNS MORE (AND WHY)?

## THE RELATIVE IMPORTANCE OF INDIVIDUAL, JOB-RELATED AND ORGANISATIONAL CHARACTERISTICS IN EXPLAINING DIFFERENCES IN EARNINGS

### 1. Introduction

Research into the determinants of pay levels has a long tradition. Much of this research is concentrated on the explanatory power of one or a limited set of determinants. Three schools can clearly be identified.

1. Research into the influence of *employee characteristics*. Many of these studies focus on testing the human capital theory and accordingly devote a good deal of attention to the effect of work experience (Duncan & Hoffman, 1978; Holzer, 1990; Strober, 1990; Williams, 1991) and level of education (Mincer, 1993; Nollen & Gaertner, 1991; Strober, 1990; Weiss, 1995) on pay differentials.
2. Research into the influence of *job level*. To the extent that job characteristics receive attention in analyses of pay differentials at all, they are usually measured only by means of the hierarchical or job level (Hartog, 1986). The job level is generally 'degraded' to the status of a variable which mediates the relationship between individual attributes and level of pay (Halaby, 1978; Malkiel & Malkiel, 1973; Rosenbaum, 1980).
3. Research into the influence of *organisational characteristics*. This type of research looks in the first place at the influence of the organisational demography – and is thus once again an indirect measurement of the effect of employee characteristics –, organisational size (Brown & Medoff, 1989; Pfeffer & Davis-Blake, 1990), and the absolute (Conyon, 1997; Hwang & Snider, 1995; Jensen & Murphy, 1991) or relative (Main, 1991) performance of the company.

The central question in this paper is whether the effects of specific factors on one or more of the levels referred to as observed in these studies remain intact if the variables of the other two levels are included. To this end we build up a regression model which attempts to explain pay differentials on the basis of a wide range of individual, job-related and organisational features. This enables us to answer the following research questions:

1. What is the relative importance of individual, job-related and organisational characteristics in explaining pay differentials? Which cluster of determinants has the greatest explanatory power?
2. Do job characteristics such as hierarchical level and functional domain exercise a significant influence on pay differentials if we control for the traditional human capital factors? In the pure form of human capital theory, job characteristics are regarded as irrelevant in explaining pay differentials. The value of this theoretical position is tested.
3. Do organisational characteristics such as size and the sector in which the company is active exercise a significant influence on pay differentials if we control for the traditional human capital factors? According to neo-classical economic theories, employees with the same qualifications and equivalent jobs receive equal pay in adequately functioning product and factor markets, and pay differentials between sectors or between large and small companies are primarily a reflection of compositional effects (differences in characteristics of the workforce). By combining individual, job-related and organisational variables in the analysis, this theoretical position, too, can be tested.

The analysis uses data from the Salary Survey (Sels & Overlaet, 2000). This was a large-scale survey, which generated pay details on a total of more than 15,000 white-collar workers (in private and public, profit as well as not-for-profit sectors). The model tested in this paper explains roughly 66% of the observed pay differentials. It is striking that more than 50% of the total explained variance can be attributed to the three individual characteristics which receive a good deal of attention in traditional human capital approaches to pay differentials: gender, level of education and work experience.

The next section of this paper briefly outlines the methodology. The regression model is then explained which underlies our interpretations. Thirdly, the precise importance of individual, job-related and organisational pay determinants is assessed.

## **2. Survey design**

Several attempts have been made in the past to gain an insight into pay levels using random samples. These attempts usually generated a very low response. Moreover, it is striking that in many surveys the item non-response to pay-related questions is extremely high. This means that until recently the only source of data on earnings available in Belgium were those produced by the National Institute for Statistics. However, these data are subject to limitations, since companies with fewer than ten employees and organisations from extremely important sectors such as health care, education, government administration and not-for-profit are excluded. Moreover, these databases do

not lend themselves to explanatory analyses, since they contain no information on the most essential person and job-related pay determinants.

For these reasons we deliberately opted to abandon the random sample approach (which would anyway have been limited due to cost considerations). The survey, which forms the basis for this paper was distributed via the job advertisement paper *Vacature*, which has a very high circulation among all hierarchical and educational levels of white-collar workers (CIM Survey, 1999). This method produced the very high response of 15,009 valid measurement points, but does create the problem that the sample reliability is almost impossible to determine. This clearly limits the scope for statistical generalisation. However, this limitation applies to all employee-based (non-administrative) wage surveys. The fact that a random sample was not used does not mean that no effort was made to define clearly the survey population or the empirical field of validity when building the Salary Survey. Blue-collar workers are excluded from this population. The results relate solely to white-collar workers (including all ranks of management). Part-time workers are also ruled out. The analyses concentrate on full-time employment in order to achieve a certain standardisation of working hours.

A number of important interventions were made in order to improve the fit between the distributions of sample and population. The most important intervention is the systematic re-weighting of the salary data. Not all groups in the labour force participated in the Salary Survey to an equal extent. Certain groups, such as men and the more highly educated, were over-represented. The salary data generated by the survey were therefore re-weighted on the basis of the characteristics 'educational level' and 'gender'. This was done using the program Weight 2.1 for Windows (Hajnal, 1995), a program for re-weighting samples on the basis of population statistics. The re-weighting allows the following important question to be answered: Suppose that the educational level of the respondents were identical to that of the wage-earning labour force, and suppose that women were represented in the survey just as strongly as on the labour market, how would the pay differentials then look? However, we have to acknowledge that this re-weighting cannot neutralise problems of self-selection. Self-selection can for example imply that someone who considers himself successful is more inclined to report that success through participation in this type of survey.

A final methodological note relates to the precise meaning of the term 'pay' in this paper. By 'pay' we understand remuneration for labour, formed in an employment relationship with an employer. The independent variable in the analyses is always the natural logarithm of the gross monthly pay. This *gross pay* is the basic pay of the employee, before any fiscal or social security deductions. This amount not only includes the hours of work performed, but also the hours of absence during illness or holiday, for which the employee retains the right to normal pay. This amount also includes overtime pay, as well

as an estimate in monetary terms of various fringe benefits. Premiums, incentives, bonuses, commission and similar income items are also included in this amount.

### 3. Distribution of salaries

Table 1 presents the distribution of salaries, which emerged from the Salary Survey after re-weighting.

**Table 1.** Gross monthly pay after re-weighting on the basis of the characteristics 'education level' and 'gender' (in Euro).

Percentiles	Industrial sectors	Service sectors	Public and not-for profit sectors	Total
95% earns more than ...	1.480	1.502	1.534	1.497
75% earns more than ...	2.096	1.996	2.076	2.037
50% earns more than ...	2.699	2.538	2.615	2.579
25% earns more than ...	3.511	3.294	3.147	3.282
5% earns more than ...	5.631	5.101	4.418	5.068
<b>P95/P5 (salary dispersion)</b>	<b>3.80</b>	<b>3.39</b>	<b>2.88</b>	<b>3.39</b>

If we look at the top of the pay ladder, a number of large differences are apparent. In the industrial sectors, the top 5% of salaries are above EUR 5,631 gross per month. In the services sectors this line can be drawn at EUR 5,101, and in the public and not-for-profit sectors at EUR 4,418. In other words, the top earners in industry earn more than those in the services; the top earners in the public and not-for-profit sectors limp along behind. The lower end of the pay ladders is about the same in all three sectors. In other words, there is a wide pay differential in the high pay categories and a small differential on the lowest rungs of the pay ladder. The 95/5 ratio, or the ratio between the 95<sup>th</sup> and fifth percentile, gives an impression of the *salary dispersion*. In industry, white-collar workers situated at the 95<sup>th</sup> percentile earn 3.8 times as much per month as white-collar workers at the fifth percentile. This multiple in the government and non-profit sectors is 2.88, which indicates a more egalitarian pay structure. In international perspective, Belgium has a relatively limited salary dispersion (OECD, 1996).

In this paper we go in search of an explanation for the pay differentials, which emerge in Table 1. We do this on the basis of a linear regression with the natural logarithm of gross monthly salary as independent variable. The following variables are included as potential determinants.

**Table 2. Variables integrated in regression analyses as potential determinants of pay differentials**

Individual characteristics	Job-related characteristics	Company characteristics
1. Educational level	4. Hierarchical level	12. Sector of employment
2. Work experience	5. Functional domain	13. Size of the organisation
3. Gender	6. Number of subordinates	14. Nationality of employer
	7. Size of budget managed	
	8. Responsibility in the job	
	9. Job autonomy	
	10. Complexity of the job	
	11. Working hours	

Table 3 presents the results. The way in which the different variables are coded can be derived from this table. For the variables 'responsibility', 'job autonomy' and 'job complexity', the measurement method is explained in the Appendix.



**Table 3. Linear regression with the natural logarithm of the gross monthly wage as dependent variable.**

	Parameter estimate after logarithmic transformation		Exponentiated parameter estimate		Interpretation based on the unstandardised parameters (exponentiated)
	Unstandardised	Standardised	Unstandardised	Standardised	
Intercept	10.7243 **	0	<b>1.127</b>	1	1.127 Eur = median wage of male operational staff without work experience, secondary education, working 32 hours/week in the after-sales services of an organisation in the socio-cultural sector with less than 50 employees
<b>Individual characteristics</b>					
Degree of higher education outside university	.1207 **	.1580	1.1283	1.1712	Someone who followed higher education outside the university will earn a gross monthly wage which will be on average 12.8% higher than the pay of a similar worker who has enjoyed no more than a secondary education
University degree	.2520 **	.1580	1.2866	1.2599	University graduates enjoy a gross monthly salary which is 28.6% higher than that of an employee with only a secondary education background
Work experience	.0301 **	.8432	1.0306	2.3238	An increase in experience with one year is accompanied by a 3.06% pay rise
(Work experience) <sup>2</sup>	-.0004 **	-.4085	0.9996	0.6646	Pay rises due to increasing work experience reduce over time
Gender	-.0785 **	-.1063	0.9245	0.8992	Women earn on average 7.55% less than men ((1 - 0.9245) * 100)
<b>Job-related characteristics</b>					
Professional	.0877 **	.0969	1.0917	1.1018	Pay of professionals is on average 9.17% higher than that of operational staff
Middle management	.1755 **	.1925	1.1918	1.2123	Pay of middle managers is on average 19.18% higher than that of oper. staff
Senior management	.3462 **	.2282	1.4137	1.2563	Pay of senior managers is on average 41.37% higher than that of oper. staff
Complexity of the job	.0002 (n.s.)	.0029	1.0002	1.0029	Complexity of the job has a significant effect on pay level
Responsibility	.0060 *	.0530	1.0060	1.0544	A higher degree of responsibility in the job is accompanied by higher pay
Job autonomy	.0038 **	.0330	1.0038	1.0336	A larger amount of job autonomy leads to a higher pay level
In charge of at least one subordinate	.0297 **	.0405	1.0301	1.0413	Someone in charge of at least one employee earns an average of around 3% more than those who are not in charge of other employees
In charge of at least 6 subordinates	.0216 *	.0249	1.0218	1.0252	Someone in charge of at least 6 subordinates has a salary which is on average 5.26% higher than the salary of a person without subordinates
In charge of at least 16 subordinates	-.0186 (n.s.)	-.0162	.9816	.9839	No additional effect
In charge of at least 30 subordinates	.0353 *	.0236	1.0359	1.0239	People with 30 or more subordinates receive a gross monthly wage which is an average of 7% higher than colleagues with no subordinates

**Table 3 (continued).** Linear regression with the natural logarithm of the gross monthly wage as dependent variable

	Parameter estimate after logarithmic transformation		Exponentiated parameter estimate		Interpretation based on the unstandardised parameters (exponentiated)
	Unstandardised	Standardised	Unstandardised	Standardised	
Budget managed	.0220 (n.s.)	.0283	1.0222	1.0287	No significant effect
Budget managed of EUR 25.000 or less	.0220 (n.s.)	.0236	1.0222	1.0239	No significant effect
Budget of more than EUR 25.000	.0424 *	.0331	1.0433	1.0337	A person who manages a budget of more than EUR 25.000 earns an average of 9% more than employees who do not manage budgets.
Working hours a week (32 hours at least)	.0033 **	.0639	1.0033	1.0660	Each hour extra that an employee works generates an average of 0.33% more pay
Administration	.0208 (n.s.)	.0240	1.0210	1.0243	Pay in administration is not significantly different from pay in after-sales
HR management	.0235 (n.s.)	.0132	1.0238	1.0133	Pay in HR management is not significantly different from pay in after-sales
Technical support	.0255 (n.s.)	.0178	1.0258	1.0180	Pay in technical support is not significantly different from pay in after-sales
Logistics	.0300 (n.s.)	.0153	1.0305	1.0154	Pay in logistics is not significantly different from pay in after-sales
Finance / bookkeeping	.0337 (n.s.)	.0259	1.0343	1.0262	Pay in finance is not significantly different from pay in after-sales
Sales	.0413 (n.s.)	.0434	1.0422	1.0444	Pay in sales is not significantly different from pay level in after-sales
Marketing	.0431 (n.s.)	.0181	1.0440	1.0183	Pay in marketing is not significantly different from pay in after-sales
General management	.0680 *	.0430	1.0704	1.0440	Pay in general management is 7% higher than pay in after-sales
Operations	.0709 *	.0712	1.0735	1.0738	Pay level in operations is 7.35% higher than pay level in after-sales
Engineering	.0861 *	.0353	1.0900	1.0359	Pay in engineering is on average 9% higher than pay in after-sales
R&D	.0939 **	.0392	1.0984	1.0400	Pay in R&D is on average 9.84% higher than pay in after-sales
EDP/IT	.1190 **	.0702	1.1264	1.0727	Pay in EDP/IT is on average 12.64% higher than pay in after-sales
<b>Organisational determinants</b>					
At least 50 employees	.0397 **	.0468	1.0405	1.0479	Gross monthly salaries in companies with 50 or more employees are on average 4.05% higher than in companies having less than 50 workers
At least 200 employees	.0264 *	.0358	1.0268	1.0364	The gross monthly salary in companies with 200 or more employees is no less than 6.8% higher than in companies with less than 50 employees (1.0405 * 1.0268)
At least 500 employees	.0383 **	.0519	1.0390	1.0533	The gross monthly salary in companies with at least 500 employees is 11% higher than in companies with less than 50 workers (1.0405 * 1.0268 * 1.0390)

\*\* p < 0.001; \* p < 0.01; n.s. not significant

**Table 3 (continued).** Linear regression with the natural logarithm of the gross monthly wage as dependent variable

	Parameter estimate after logarithmic transformation		Exponentiated parameter estimate		Interpretation based on the unstandardised parameters (exponentiated)
	Unstandardised	Standardised	Unstandardised	Standardised	
Hotel and catering	-.0570 (n.s.)	-.0166	.9446	.9835	Pay in H&C does not differ significantly from pay in socio-cultural sector
Public services	.0325 (n.s.)	.0288	1.0330	1.0292	Pay in public service does not differ significantly from pay in socio-cult. sector
Retail	.0355 (n.s.)	.0240	1.0361	1.0243	Pay in retail does not differ significantly from pay in socio-cultural sector
Telecommunication	.0363 (n.s.)	.0197	1.0370	1.0199	Pay in telecom does not differ significantly from pay in socio-cultural sector
Transport	.0451 *	.0273	1.0461	1.0277	Pay in transport is on average 4.61% higher than pay in socio-cultural sector
Services to companies	.0592 *	.0443	1.0610	1.0453	Pay in services to companies is on average 6.1% higher than the pay level in the socio-cultural sector
Textile	.0652 *	.0278	1.0674	1.0282	Pay in textiles is on average 6.74% higher than pay in socio-cultural sector
Health care	.0719 **	.0491	1.0745	1.0503	Pay in health care is on average 7.45% higher than pay in socio-cult. sector
Building industry	.0771 **	.0344	1.0802	1.0350	Pay in building industry is on average 8% higher than pay in socio-cult. sector
Wood and paper	.0790 **	.0354	1.0822	1.0360	Pay in wood/paper is on average 8.22% higher than pay in socio-cult. sector
Food industry	.0810 **	.0403	1.0844	1.0411	Pay in food industry is on average 8.44% higher than pay in socio-cult. sector
Education	.0852 **	.0569	1.0889	1.0585	Pay in education is on average 8.89% higher than pay in socio-cultural sector
Metal industry	.0863 **	.0632	1.0901	1.0652	Pay in metal is on average 9,01% higher than pay in socio-cult. sector
Information technology	.1055 **	.0438	1.1113	1.0447	Pay in IT is on average 11.1% higher than pay in the socio-cultural sector
Banks and insurance	.1334 **	.1228	1.1427	1.1307	Pay in banks and insurance companies is on average 14.27% higher than the pay level in the socio-cultural sector
Chemical industry	.1435 **	.1035	1.1543	1.1090	Pay in chemical industry is on average 15.43% higher than the pay level in the socio-cultural sector
Energy sector	.1970 **	.0598	1.2177	1.0616	Pay level in energy sector is on average 21.77% higher than pay in the socio-cultural sector
Dutch company	.0350 *	.0197	1.0356	1.0199	Pay in Dutch companies is on average 3.56% higher than in Belgian comp.
Japanese company	.0378 (n.s.)	.0085	1.0385	1.0085	Pay in Japanese companies does not differ from pay in Belgian companies
French company	.0531 *	.0207	1.0545	1.0209	Pay in French companies is on average 5.45% higher than in Belgian comp.
British company	.0790 **	.0278	1.0822	1.0282	Pay in British companies is on average 8.22% higher than in Belgian comp.
German company	.1001 **	.0472	1.1053	1.0483	Pay in German companies is on average 10.53% higher than in Belgian companies
American company	.1455 **	.1023	1.1566	1.1077	Pay in US companies is on average 15.66% higher than pay in Belgian comp.

\*\* p < 0.001; \* p < 0.01; n.s. not significant

The combined explanatory power of all the determinants is large. Together they explain 65.9% of the total variation in pay levels (Adjusted  $R^2 = .659$ ). We can thus attribute roughly two-thirds of the observed pay differences to the reported individual, job-related and organisational characteristics. The fact that this explanatory potential is not even higher is due to the fact that many characteristics, which could have an impact on pay levels, were not included in the Salary Survey. Examples include company strategy, trade union power, company performance, capital structure and complexity of the business, degree of competition on the labour market (Milkovich & Newman, 1999), individual performance level (Bushman, Indjejikian & Smith, 1996; Nollen & Gaertner, 1991), etc. Most of these factors are very difficult to include in an employee survey.

#### **4. Explanation of pay differentials**

This section explains the main determinants from the foregoing model. Attention is focussed on the relative importance of individual, job-related and organisational characteristics.

##### **4.1 Individual determinants**

Three individual characteristics were included in the analysis: level of education, work experience and gender.

*Level of education.* In competitive models such as the human capital theory, a good deal of attention is devoted to returns on investment in education and training. The central assumption is that all pay should be equal if all employees were capable of performing all jobs without training, and were indifferent in their search behaviour with regard to the full array of jobs. Pay differentials are then explained by the fact that deviations exist in these assumptions.

The human capital theory attributes pay differentials to differences in initial schooling and (on the job) training. Schooling, education, training, etc., are seen as investments in human capital or productive capacity. It is assumed that an individual selects an educational or training programme on the basis of an analysis of costs and benefits. A rational person will invest in his human capital if the benefits of that investment ultimately equal or surpass its costs. The willingness to invest is thus dependent on the expectation that the investment will lead to a higher pay level. Pay differentials based on educational differences thus encourage the willingness to invest.

The regression analysis confirms the great importance of educational level as a determinant of pay level. The analysis shows that, if a white-collar employee has followed higher education, his or her pay will on average be 12.8% higher than the pay of a (similar) worker who has enjoyed a secondary education (or a lower level of education). University graduates enjoy a gross monthly salary, which is 28.7% higher on average than that of an employee with a secondary (or

even lower) educational background. On this basis it can therefore be concluded that the level of education retains an important predictive power, even when job-related and organisational characteristics are included in the explanatory model. This finding does not necessarily imply a confirmation of the human capital logic, since there is a wide range of competing explanations for this effect of educational level. The 'screening hypothesis' is particularly influential here. We will discuss two variants of this hypothesis, namely the signalling model (Arrow, 1973; Spence, 1974) and the credentialist perspective (Thurow, 1975).

The human capital theory posits that more education leads to higher pay because it is also accompanied by higher productivity. *Signalling models*, by contrast, posit that employers will pay better educated employees a higher salary even if their education has no direct effect on their productivity. These models do begin from the assumption that there is a correlation between capability and productivity and that, if potential employees are divided into a group with relatively high capability and a group with relatively limited capability, an additional investment in education for the former group 'costs' relatively less (Strober, 1990). Given this cost differential together with the higher remuneration which employers link to a higher education, it is also more attractive for the more capable group to invest in additional education and thus to 'signal' their higher capability (and productivity) to employers. This confirms employers in their assumption that better educated workers are also more productive, and affirms their use of educational level as an indicator or signal of higher productivity.

In most signalling models it is posited that the level of education has an effect only at the start of a person's career. Education helps to open the door to employment at a time when the employer cannot yet fall back on factors such as individual productivity (Bills, 1988). The level of education is then used as an indicator for assessing that productivity. As the employee progresses in his or her career, the initial level of education could weigh in importance in favour of performance indicators. This assumption is refuted by additional analyses, which demonstrate that the level of education does not lose its explanatory power as the number of years of service increases (Sels & Overlaet, 2000). Internal labour market theories offer a more robust explanation here, arguing that the screening on commencement of employment not only determines the initial job and starting pay, but also the career ladder(s) to which employees gain access.

A completely different perspective is offered by Thurow's *credentialist theory*. Characteristic of this theory is that Thurow sees pay much more as a fixed characteristic of a job, which is separate from the person who holds that job. Productivity is not seen as a function of educational level, but rather of the way in which employers give form to their jobs (level of responsibility, capital intensity, promotion opportunities, etc.) and the nature and extent of on-the-job training provided by that employer. On the basis of this assumption, it can be expected that differentials will not be directly dependent on differences in education, but rather on differences between the jobs offered by employers. However, this assumption must be refuted on the basis of the regression.

Education level retains a real influence on pay differentials, even after controlling for the hierarchical level of the job, the functional domain within which the job is situated, the specific job characteristics and the number of years of work experience (as an indicator for the extent of on-the-job training). This confirms earlier findings by Hartog (1986), who indicates that the pay structure is much more than a simple transformation of the existing job structures.

It should however be noted here that Thurow's theories also allow for a correlation between educational level and pay, by stating that candidates on the labour market are involved in competition to acquire jobs. These candidates are ranked by employers; better educated clients are systematically higher up the pecking order thus created, because educational level is used by employers primarily as a signal of 'trainability'. Employees are encouraged above all to invest in additional education, not so much because they will then be able to attain higher pay through higher productivity, but because they will be able to secure their position in the market for jobs. In this sense, this line of reasoning does not contradict the results of the regression analysis.

*Work experience.* The human capital theory explains pay differentials not only on the basis of education, but also the number of years' work experience (Mincer, 1974; Weiss, 1986). It is argued that the productivity of a worker (the value of his human capital) increases with his work experience. Moreover, the number of years of work experience is used as a 'proxy' for non-observable investments in on-the-job training (Duncan & Hoffman, 1978). The human capital approach thus assumes that increasing work experience is accompanied by a steady rise in pay (Strober, 1990). This relationship is confirmed in the regression analysis. The human capital theory also predicts that investments in human capital decline in a monotonous trend with age. Experience also ages, possibly leading to a fall in productivity (depreciation of human capital). As a consequence, pay increases reduce over time. This 'rust effect' explains why pay profiles have a concave rather than a linear character. In order to test this concave character, the variable 'work experience' is incorporated in the model both linearly and quadratically (Table 3). This quadratic term is both significant and negative, indicating that pay increases do indeed weaken over time.

If we replace work experience by length of service for the current employer, the analysis produces virtually identical effects. The interpretation from a human capital perspective is also virtually identical. Other theoretical perspectives do not in fact dispute these observations, but do take issue with the way in which they are interpreted by the human capital theory. A very influential alternative is offered by efficiency wage models. These claim that companies which are confronted by high staff turnover or which have problems in measuring individual productivity, develop pay schemes which encourage workers to stay with the company and to maintain maximum productivity. Such a pay scheme may mean that employees are paid less than their actual level of value creation in the early years, but higher than this level later in their careers. This gives workers the prospect in their early years of higher pay in later years. This can encourage them to stay and to avoid slacking (avoiding risk of dismissal). This effect continues in later years, since if they move to a

different employer, employees risk falling back to a pay level which is at or even below the level of their actual added value creation, rather than above it. According to efficiency wage models, therefore, pay does not increase with work experience or seniority because this reflects an increase in productivity (as a result of on-the-job training), but because employers feel compelled to give their employees additional stimuli (Medoff & Abraham, 1981). A similar line of thinking has been developed by internal labour market theories. Whereas according to efficiency wage theories the root of pay increases encourage employee loyalty, internal labour market theories attribute this function to promotion opportunities (Osterman, 1984).

*Gender.* The regression analysis indicates that women, *ceteris paribus*, earn an average of 7.55% less than men (Table 3). This gender effect, too, is often interpreted from a human capital perspective. According to this theory, women adopt different 'utility functions' in their career and life planning, and this leads them to make different choices (Strober, 1990). This manifests itself particularly in their choice of training programmes with a smaller 'pay-off', jobs with high starting salaries and low demands with regard to on-the-job training and, above all, of regular (part-time) career interruption (Polachek, 1987). The expectation that women will interrupt their careers more frequently is used as a basis for the human capital hypothesis that women's starting pay is just as high as for men but their 'age-pay' profile is at the same time much flatter. Precisely because of *expected* interruptions, they are also claimed to be less willing to invest in on-the-job training, because they do not expect to be active on the labour market for long enough for this investment to repay itself. The *actual* interruption is moreover accompanied by a depreciation of human capital.

Further analyses bear out the supposition that the pay profile of women is flatter. However, the assertion that the starting pay for women is just as high as for men is refuted on the basis of these analyses: women's starting pay is also lower (Sels & Overlaet, 2000). This means that women do not (only) build up a disadvantage relative to men (among other things through more career interruptions), but are evidently faced with a pay handicap at the starting line. This finding, which is in line with known studies, such as those by England et al. (1988) and Duncan and Prus (1992) strengthens the suspicion that the human capital approach provides a distorted picture of reality. It should be pointed out here that recent research also provides a more subtle impression of the effect of career interruptions on pay development. For example Albrecht, Edin, Sundström, and Vroman (1999) demonstrate that the influence of career interruption on pay development depends greatly on the nature of that interruption, and that the negative effect of interruptions on the development of pay is significantly stronger among men than among women.

Segmentation theories offer an alternative explanation. Segmentation should be seen as a collective name for processes, which lead to a limitation of the competition for jobs. This means that certain (types) of workers have more difficulty in gaining access to certain (types) of jobs (with a given pay level), because employers select candidates on the basis of individual or group characteristics (Glebbeeck, 1993). The selection criteria adopted may be applied

so systematically that they result in a segmentation of *workers*, a segmentation according to the type of jobs for which they are eligible. It is not only workers but also *jobs* that are segmented, by the types of position for which they form a good springboard. This segmentation of jobs gives rise to career paths or job chains.

*Segmentation of workers* means that individual or group characteristics determine which jobs these workers can attain. Processes of statistical discrimination can play a particular role here. Statistical discrimination occurs primarily where employers have imperfect information about the productivity of candidate employees and therefore use characteristics of the employee as a source of information about his/her productivity. It is thus possible that employers assess the 'attraction' of women lower during recruitment and when determining pay levels, for example because they expect women to interrupt their careers more frequently. Reference is made to statistical discrimination among other things in the 'labour queue' theory, which was developed in the context of Thurow's 'credentialist view' (see above). Selection occurs not so much on the basis of an assessment of individual qualities, but on the basis of group averages. This gives rise to a 'labour queue' which can vary per job group, but which nevertheless means that people with a lower level of education, women, members of ethnic minorities, etc. are often at the end of the queue when it comes to jobs with the highest pay and/or the best career prospects. This segmentation of female workers can be reinforced by existing *segmentation of jobs*. For example, statistical discrimination at the 'entry level' may mean that women more frequently end up in positions which form part of a less promising job chain or career path and which in this sense provide a less resilient springboard to higher and better paid positions.

#### 4.2 Job-related determinants

To the extent that research into pay differentials devotes attention to job characteristics, this is usually limited to an analysis of the influence of the hierarchical level. In the regression model an attempt was made to measure the effect of the functional domain as well. Moreover, a wide range of more specific job characteristics was integrated in the model (complexity, autonomy, budget managed, etc.).

We integrate these job characteristics in the first place in order to investigate whether characteristics of jobs have an effect on levels of pay if we control for the traditional 'human capital' variables such as education and work experience. The presence of such an effect suggests that the human capital theory is by no means able to explain the full range of pay differentials (Hartog, 1986).

*Hierarchical level.* The model distinguishes between four levels (Table 3). 'Senior management' is understood as the general manager and the heads of the corporate departments who report directly to the general manager. 'Middle management' includes managers who are in charge of implementation and do not report directly to the general director. 'Professionals' are employees in staff



departments or staff positions. Finally, 'operational staff' are understood as workers who carry out a clearly defined task in a subordinate role, for example a bookkeeper who works under an administrative director.

Based on the regression analysis it is possible to measure the effect of the hierarchical level. This effect is considerable. The gross monthly pay of professionals, all things being equal, is on average 9.2% higher than that of operational staff. The salaries of middle managers are an average of 19.1% above those of operational staff, while the monthly salary of senior managers is an average of 41.4% higher than the monthly pay of operational staff. It can be deduced from these differences in pay levels that the salary is not only a form of compensation, but is also a concrete and highly visible symbol of authority (Robinson & Kelley, 1979; Wright, 1978). The level of the job thus has a significant effect on the level of pay, even if we control for the human capital factors 'work experience' and 'education' (cf. Hartog, 1986; Rosenbaum, 1980). Conversely, of course – and this underlines the great importance of the individual characteristics – both educational level, work experience and gender retain a substantial explanatory power, even where the pay levels of employees at the same hierarchical level are compared with each other.

*Functional domain.* Pay differences occur not only between hierarchical levels; the domain to which a job belongs can also help determine the employee's monthly salary.

The results show that the domain 'after-sales service' contains the lowest pay (intercept). This domain forms a single cluster together with other domains, which show no significant mutual pay differentials. These are the commercial domains and the central services: logistics, marketing, sales, administration, finance, bookkeeping and HRM. The fact that this large group of functional domains, after controlling for all manner of compositional effects, shows no mutual significant pay differentials, indicate that the pay differential between functional domains is very limited. In terms of remuneration, therefore, it makes little difference whether an employee builds a career in personnel management or in marketing or bookkeeping, for example. Only four domains show a significant deviation from the reference category in terms of average pay level. In the first place these are the operational departments: the primary process where the actual added value is created. However, it is primarily the technical domains such as engineering, R&D and EDP/IT where significantly higher wage levels are found.

We must however conclude that the functional pay differential is fairly low. American companies, for example, show a much stronger functional differentiation (Foster, 1985). This is a very important observation in the context of human resources management. Functional or 'horizontal' pay levelling simplifies the construction of multifunctional career ladders. If it is the intention that employees should develop expertise during their career in various functional domains, it is a good thing if the pay differentials between the different posts are not too great (Pfeffer, 1994).

*Job characteristics.* In addition to the hierarchical level and the functional domain, a wide array of other job characteristics were surveyed in the Salary Survey. We refer to the regression for the effects of these characteristics. We shall limit ourselves here to a brief discussion.

We shall first discuss the effect of the number of subordinates on level of pay. We pointed out earlier that hierarchical level has a strong effect. Naturally, employees at higher levels of the hierarchy are in charge of more employees (on average). The fact, that middle managers have a higher salary on average than professionals, can therefore be explained in part by the fact that they have a larger number of subordinates. The question we ask ourselves here is whether the number of subordinates has an additional impact on pay levels if we control for differences in hierarchical level. The regression analysis indicates that this effect is indeed present, though the additional explanatory power is limited. Those in management positions, all things being equal, earn an average of around 3% more than those who are not in charge of other employees. This situation changes where managers have 30 or more subordinates: their pay is then an average of 7% higher than for colleagues with no subordinates. The size of the budgets, which are managed in a person's job, also has a significant effect on top of that of hierarchical level. However, this effect only occurs once the budgets exceed EUR 25.000. Employees who manage such budgets earn an average of 9% more than employees who do not manage budgets.

We can also analyse the effect of job content. Based on a series of scales, which attempt to chart job content (see Appendix), indices were formulated for the level of responsibility, level of complexity and autonomy in the job. It can be deduced from the analysis that a high degree of autonomy and a high level of responsibility for the work of others and for the functioning of a department or team are accompanied (all things being equal) by significantly higher pay. In particular, the relationship between level of pay and autonomy in the post is not obvious. It is not terribly clear here what is the cause and what is the consequence, though it can be deduced from the relationship that a low intrinsic pay level (low level of autonomy in the job) is not offset by high extrinsic remuneration (high pay). High extrinsic and high intrinsic remuneration go together and may reinforce each other.

Finally, the effect of working hours is more obvious. Although the regression is limited to full-time workers, wide differences can still occur within this group in terms of number of hours invested in the job per week (including work at home, moonlighting, etc.). If we start the scale at 32 working hours per week, each hour extra that an employee works generates an average of 0.33% more pay. This is a statistically significant effect.

### **4.3 Organisational determinants**

Research into the determinants of pay levels has long ignored characteristics on the demand side of the labour market. The scarce research which has looked at demand-side factors indicates that different employers pay employees with comparable 'human capital' different amounts (Groschen, 1991). Given the

limited number of data gathered in this salary survey about employers or organisations, few conclusive remarks can be made on the importance of demand-side factors. This certainly is a serious limitation of employee-based wage surveys. In what follows we shall therefore limit ourselves to the influence of the sector in which the organisation operates (as an indicator of the organisation's activity), the size of the organisation and the nationality of the parent company.

*Sector.* According to the neo-classical theory, employees with the same qualities and equivalent jobs, where the product and factor markets are working satisfactorily, receive equal pay, and pay differentials between sectors merely reflect compositional effects. In other words, wages in some sectors are indeed higher than in others, but this is alleged to be related solely to the fact that organisations and their employees have different characteristics. We will clarify this with an example. Since older workers earn more than younger workers, and people with a higher education earn more than people with a lower education, shifts in the educational level and the age profile influence the rise in average pay within a sector. This is a clear compositional effect.

The regression analysis shows that it is not only these compositional effects, which are responsible for differences between sector pay levels. Even after controlling for important determinants such as gender, work experience, level of education, hierarchical level, etc., we see strong significant differences between sector pay levels. In the regression analysis, the average gross monthly salary in the socio-cultural sector was used as a reference category. Pay levels in retail and the public services do not deviate significantly from pay levels in the socio-cultural sector. If we look at the other sectors, however, clear differences emerge. The results indicate a wide sectoral pay differentiation. If we compare the poles of the pay hierarchy, we see that the average monthly salary in the energy sector is on average 21.8% higher than in the socio-cultural sector (Table 3). In this pay hierarchy, the top five positions are taken by the chemical industry, banks and insurance companies, the information technology sector and the metal industry. The picture of strong sectoral pay differentiation is confirmed in international comparisons (Van der Wiel, 1999). For example, in the early 1990s the differentiation in Belgium was greater than in Finland, Denmark, the Netherlands, Sweden, France, Canada, Germany, and the US, but smaller than in Japan, Italy, Norway and the United Kingdom. If we look at the increase in differentiation in the period 1970-1990, we see that, with the exception of the UK, pay differentials between sectors rose more strongly in Belgium than anywhere else.

One explanation for this differentiation which is put forward by the neo-classical economic theory is that pay differentiation acts as a 'lubricant', which keeps the wheels of the labour market turning smoothly. In a well-functioning labour market, pay levels in a sector with a tight labour market must rise more strongly than in a sector where there are no bottlenecks. This has the effect of drawing in additional workers to that sector. This additional influx then exerts downward pressure on the increased wages on that sector. In the other sectors, by contrast, pay levels will rise as a result of the departure of

employees. The balance is thus restored. This example shows that pay differentiation must promote the adaptation processes on the labour market via mobility of labour (Hofman, Compaijen, & Van Ours, 1992).

It is indeed the case that pay differentials can arise between sectors with a high supply of workers and those with a low supply of workers (Bell & Freeman, 1991; Nord, 1999). However, these pay differentials may be sustained if the barriers between these sectors have little 'permeability' (low intersectoral mobility). Many barriers can reduce the capacity or willingness of employees to transfer to better paying sectors. The result is then *market segregation*. This can lead to a 'fossilisation' of pay differentials. This process can be fostered by differences in productivity increases between sectors. In sectors with rapidly rising pay levels thanks to sharply increasing productivity, these higher pay levels may also be sustained without an increase in employment, particularly if a good deal of labour is substituted by capital at the same time.

This 'fossilisation' of pay differentials is fairly typical of the Belgian situation. The sectoral pay differentiation is not only very high. It is also very stable, with the sectoral pay structure undergoing virtually no change. Sectors, which paid high salaries in the 1970s, still do so in the 1990s. In industry in particular, the pay structure has hardly adapted at all to the changed labour market. Although the increases in labour productivity and unemployment rates differ widely from sector to sector, there is absolutely no relationship between pay levels and these differences, which are relevant for the formation of pay. Goubert and Heylen (1999) point out that this can have a deadly effect on the mobility of employees. The parallel pay trends, they argue, mean that workers have little encouragement to look towards sectors with better future prospects.

*Company size.* All things being equal, large companies pay better. If we compare companies with 50 or more employees with companies having fewer than 50 workers, we see that gross monthly salaries are on average 4% higher in the former group (Table 3). The gross monthly salary in companies with 200 or more employees is no less than 6.8% higher. Very large companies, in particular, pay high wages. For example, the average gross monthly salary in companies with at least 500 employees is 11% higher than in companies with fewer than 50 workers. Company size explains a substantial part of pay variation in industrial sectors in particular. A regression analysis which was built up separately for industry reveals that gross monthly salaries in industrial companies with at least 500 workers is no less than 22.9% higher than the level of pay in small industrial companies (Sels, Welkenhuysen-Gybels, Schrijvers, & Overlaet, 1999).

Several studies report this positive effect of company size on pay (Brown & Medoff, 1989). The interpretations do however vary. For example, the higher pay in larger companies is seen in some studies as a compensation for the greater complexity of large businesses (Conyon, 1997). This reasoning is followed particularly in studies of management compensation, where it is assumed that larger companies also need more capable managers. Other arguments claim that workers in these companies demand (and receive) higher pay as compensation for the less pleasurable working climate (less personal

atmosphere, stronger division of work, etc.). We would in any event state that in our analysis other factors may lurk behind company size, such as differences in company performance, capital strength, trade union activity and strength, employee mobility, etc.

*Nationality.* It is not only company size and sector that have a relatively large explanatory power on observed pay differentials; the same applies for the nationality of the parent company. American companies, all things being equal, pay an average of 15.7% more than Belgian companies. They are followed in the pay hierarchy by German, British and French companies. Here again, this striking difference can mask other characteristics such as company performance, the multinational size of these companies, etc.

## **Conclusion**

This paper looks at the explanation of pay differentials in Belgium. By way of a synthesis, we will conclude with the results of an analysis of variance. An analysis of variance allows the share of each determinant in the explanation of pay differentials to be shown. We would repeat here that the characteristics involved in the analysis are able to explain 65.9% of the observed differences between monthly salaries of 'white-collar workers' (Adjusted R<sup>2</sup>). The result of the analysis of variance given below shows the contribution of each individual determinant to this overall explanatory power.

**Table 4.** Contribution of each individual determinant to the overall explanatory power. Results of an analysis of variance.

	Contribution to the explanation of pay differences	Position in the overall ranking of determinants
<b>Individual characteristics</b>		
- Work experience	32.10%	(1)
- Level of education	19.99%	(2)
- Gender	4.41%	(7)
<i>Total contribution of individual determinants</i>	56.49%	
<b>Job-related characteristics</b>		
- Hierarchical level	15.72%	(3)
- Functional domain	2.57%	(8)
- Size of budget managed	1.69%	(9)
- Working hours (starting at 32 hours)	1.32%	(10)
- Number of subordinates	1.06%	(11)
- Level of responsibility	0.76%	(12)
- Level of autonomy in the job	0.48%	(13)
- Level of job complexity	0.23%	(14)
<i>Total contribution of job-related determinants</i>	23.83%	
<b>Organisational characteristics</b>		
- Sector	8.77%	(4)
- Nationality of the parent company	5.63%	(5)
- Organisation size	5.27%	(6)
<i>Total contribution of organisational determinants</i>	19.68%	
<b>Total</b>	<b>100%</b>	

The five most important determinants, in order of importance, are: work experience, level of education, hierarchical level, sector and nationality of the parent company. The impact of work experience exceeds that of all other determinants.

On the one hand the explanatory models, based on a human capital logic, are confirmed by the dominant explanatory power of the individual characteristics (56.49%). And yet it was shown in this paper that plausible alternative explanations exist for this strong effect of level of education, work experience and gender, and that these alternatives moreover take more account of characteristics on the demand side. On the other hand, the regression model removes the illusion of the simplicity of human capital explanations. In particular, the claim that job-related and organisational characteristics are of no importance in explaining pay differentials must be refuted. Both clusters of determinants make a substantial contribution (23.83% for job-related, 19.68% for

organisational characteristics). In fact we suspect that the influence of job-related and organisational characteristics are underestimated in our analyses, because the analyses do not include important characteristics on the demand side (degree of unionisation, company performance, perceived tightness of the labour market, etc.), or are particularly difficult to measure in an employee-based wage survey (complexity of the job, autonomy, capital intensity, etc.). There is also a lack of information about the career of the employee. In line with internal labour market theories, it may be that pay levels are not so much determined by characteristics of an employee's present job, but much rather by the characteristics of the career path on which the employee is engaged. Despite these constraints, the job-related and organisational characteristics are still able to explain a substantial part of the pay differentials observed.

## Appendix

The factors 'responsibility in the job', 'autonomy' and 'degree of complexity', which were included in the regression analysis as determinants, are the result of a personal assessment by the respondents. To this end, a battery of items was put to respondents in the questionnaire, each of which had to be evaluated on a four-point scale (ranging from disagree completely to agree completely). Following a reliability analysis, three ten-point scales were constructed on the basis of these items, which show the degree of responsibility, degree of autonomy and degree of job complexity as assessed by the respondent. For each of these scales, the items on which they are based are indicated below.

### *Responsibility (Cronbach's Alpha: .824)*

'I have a good deal of responsibility for other people's work'; 'I often have to take decisions in which a mistake could have expensive or serious consequences'; 'I carry a good deal of responsibility for the future of others'; 'I carry a good deal of responsibility for the functioning of a department or team'.

### *Autonomy (Cronbach's Alpha: .837)*

'My superior is constantly looking over my shoulders'; 'I can decide for myself how I do my work'; 'My working method is largely prescribed'; 'I decide for myself when I carry out a task'; 'My work rate is imposed entirely by others'.

### *Degree of complexity (Cronbach's Alpha: .796)*

'I am often confronted with unexpected events in my work'; 'Much of my work is routine'; 'I have to keep my eye on lots of things at the same time in my work'; 'My work consists almost entirely of difficult tasks'; 'My job demands a high degree of skill'; 'My job demands that I constantly learn new things'.

## References

- Albrecht, J.W., Edin, P.A., Sundström, M., & Vroman, S.B. (1999). Career interruptions and subsequent earnings. *The Journal of Human Resources*, 34, 294-311.
- Arrow, K. (1973). Higher education as a filter. *Journal of Public Economics*, 2, 193-216.
- Bell, L.A., & Freeman, R.B. (1991). The causes of increasing interindustry wage dispersion in the United States. *Industrial and Labor Relations Review*, 44, 275-287.
- Bills, D.B. (1988). Educational credentials and promotions: does schooling do more than get you in the door? *Sociology of Education*, 61, 52-60.
- Brown, C., & Medoff, J. (1989). The employer size-wage effect. *Journal of Political Economy*, 97, 1027-1059.
- Bushman, R.M., Indjejikian, R.J., & Smith, A. (1996). CEO compensation: the role of individual performance evaluation. *Journal of Accounting and Economics*, 21.
- Canyon, M.J. (1997). Corporate governance and executive compensation. *International Journal of Industrial Organization*, 15, 493-509.
- Doeringer, P.B., & Piore, M.J. (1971). *Internal labor markets and manpower analysis*. Heath: Lexington.
- Duncan, G.J., & Hoffman, S. (1978). On-the job training and earnings differences by race and sex. *The Review of Economics and Statistics*, 61, 594-603.
- Duncan, K.C., & Prus, M.J. (1992). Starting wages of women in female and male occupations: a test of the human capital explanation of occupational sex segregation. *Social Science Journal*, 29, 479-494.
- Foster, K. E. (1985). An anatomy of company pay structures. *Personnel*, 3, 69-70.
- Glebbeek, A.C. (1993). *Perspectieven op loopbanen*. Assen: Van Gorcum.
- Goubert, L., & Heylen, F. (1999). In J. Van Hoof and J. Mevissen (Eds.), *In banen geleid. Nieuwe vormen van sturing op de arbeidsmarkt in België en Nederland*. Delft: Elsevier.
- Groshen, E.L. (1991). Five reasons why wages vary among employers. *Industrial Relations*, 30, 350-381.
- Hajnal, I. (1995). *Weight 2.1 voor Windows*. Leuven: Centrum voor Dataverzameling en Analyse.
- Halaby, C.N. (1978). *Job-specific sex differences in organizational reward attainment. Wage discrimination vs. rank segregation*. Madison, Wisc.: Institute for Research on Poverty.
- Hartog, J. (1986). Earnings functions: beyond human capital. *Applied Economics*, 18, 1291-1309.
- Hofman, P.S., Compaijen, C., & Van Ours, J.C. (1992). *Sectorale loondifferentiatie en werkgelegenheid in internationaal perspectief*. 's-Gravenhage: OSA.
- Holzer, H. (1990). The determinants of employee productivity and earnings. *Industrial Relations*, 29, 403-421.
- Hwang, L., & Snider, H.K. (1995). Executive pay and performance: evidence from the US banking industry. *Journal of Financial Economics*, 39, 105-130.



- Jensen, M.C., & Murphy, K.J. (1991). Performance pay and top-management incentives. *Journal of Political Economy*, 98.
- Main, B.G. (1991). Top executive pay and performance. *Managerial and Decision Economics*, 12, 219-229.
- Malkiel, B.G., & Malkiel, J.A. (1973). Male-female differentials in professional employment. *American Economic Review*, 63, 693-705.
- Medoff, J.L., & Abraham, K.G. (1981). Are those paid more really more productive: the case of experience. *Journal of Human Resources*, 16, 186-216.
- Milkovich, G.T., & Newman, J.M. (1999). *Compensation*. Boston: Irwin McGraw-Hill.
- Mincer, J. (1974). *Schooling, Experience and Earnings*. New York: NBER/Columbia University Press.
- Mincer, J. (1993). Human capital and earnings. In J. Mincer (Ed.), *Studies in human capital*. Brookfield: Edward Elgar.
- Nollen, S.D., & Gaertner, K.N. (1991). Effects of skill and attitudes on employee performance and earnings. *Industrial Relations*, 20, 435-455.
- Nord, S. (1999). Sectoral productivity and the distribution of wages. *Industrial Relations*, 38, 215-230.
- OECD. (1996). Making work pay. *Employment Outlook*, 25-57.
- Osterman, P. (1984). White-collar internal labor markets. In P. Osterman (Ed.), *Internal Labor Markets*. Cambridge: MIT Press.
- Pfeffer, J., & Davis-Blake, A. (1990). Determinants of salary dispersion in organisations. *Industrial Relations*, 29, 38-57.
- Pfeffer, J. (1994). *Competitive advantage through people*. Boston: Harvard Business School Press.
- Polachek, S.W. (1987). Occupational segregation and the gender wage gap. *Population Research and Policy Review*, 6, 47-67.
- Robinson, R.V., & Kelley, J. (1979). Class as conceived by Marx and Dahrendorf: effects on income inequality and politics in the United States and Great Britain. *American Sociological Review*, 42, 285-301.
- Rosenbaum, J.E. (1980). Hierarchical and individual effects on earnings. *Industrial Relations*, 19, 1-14.
- Sels, L., Welkenhuysen-Gybels, J., Schrijvers, E., & Overlaet, B. (1999). Hoger lager. Loonspanning en loonsamenstelling in Vlaanderen. *De arbeidsmarkt in Vlaanderen. Jaarboek Steunpunt WAV 1999*, 311-354.
- Sels, L., & Overlaet, B. (2000). *Lonen in Vlaanderen*. Leuven: ACCO.
- Spence, M. (1974). *Market signalling: Informational transfer in hiring and related screening processes*. Cambridge: Harvard University Press.
- Strober, M. (1990). Human capital theory: implications for HR managers. *Industrial Relations*, 29, 214-239.
- Thurow, L.C. (1975). *Generating inequality. Mechanisms of distribution in the U.S. economy*. New York: Basic Books.
- Van der Wiel, H.P. (1999). Loonverschillen tussen bedrijfstakken. *ESB*, 84, 492-494.
- Weiss, A. (1995). Human capital versus signalling explanations of wages. *Journal of Economic Perspectives*, 9, 133-154.

- Weiss, Y. (1986). The determination of life cycle earnings: a survey. In O.C. Ashenfelter and R. Layard (Eds.), *Handbook of labor economics*. Amsterdam/New York: North-Holland.
- Williams, N. (1991). Re-examining the wage, tenure and experience relationship. *The Review of Economics and Statistics*, 73, 512-517.
- Wright, E.O. (1978). *Class structure and income inequality*. New York: Academic Press.

