Wage policy patterns at the firm level: An analysis on Italian medium and large firms

Francesca Sgobbi

2013

WP n.º 2013/05

DINAMIA'CET

CENTRO DE ESTUDOS SOBRE A MUDANÇA
SOCIOECONÓMICA E O TERRITÓRIO
ISCTE-IUL

FCT
Fundação para a Ciência e a Tecnologia
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

Wage policy patterns at the firm level:

An analysis on Italian medium and large firms[1]

Francesca Sgobbi *

WP n.º 2013/05

---

*DINÂMIA'CET – IUL and DIMI – University of Brescia (I) E-mail: francesca.sgobbi@unibs.it.

Wage policy patterns at the firm level:

An analysis on Italian medium and large firms

Abstract

This paper provides an empirical analysis of wage policy at the firm level. Based on cluster analysis applied to a sample of medium and large Italian firms and their employees, this paper classifies the wage policy patters adopted, outlines the drivers underpinning the identified patterns and provides preliminary evidence on the dynamics of wage policy at the firm level. The results of the empirical analyses show that identified wage policy patterns present a mix of hybrid characteristics rather than align with the ideal types of the internal and the external labour markets hypothesised in the literature. The wage policy models adopted by sampled firms display significant dynamic patterns between 1989 and 2004: 28.9% of the firms sampled in both years switch to a different wage policy pattern, with an overall increase of firms providing leading pay rates.

1. INTRODUCTION

Wage policy has long been recognized as a key determinant of firm success (Dulebohn and Werling, 2007). By setting the level and the structure of internal rewards the wage policy defines the position of a firm compared to the pay systems offered by competitors and drives the capability to attract and retain a workforce endowed with the required characteristics (Werner and Werd, 2004). A fair distribution of pays across jobs requiring differentiated efforts affects the satisfaction of employees for the treatment received relative to their peers (Atkinson, 2007) and improves industrial relations and internal climate. In addition, a properly designed wage policy balances the contrasting needs of raising wages to increase employees' effort and commitment and limiting labour costs in favour of firm profitability (Brown *et al.*, 2003).

Literature on wage determinants and firm-level wage policy often contrasts the models of the internal and the external labour markets (Doeringer and Piore, 1971). Whereas the former is based on higher than average wage rates and limited ports of entry to encourage internal career paths and long-term employment relationships, the latter places emphasis on internal and external competition to access the most critical and best rewarded jobs. If empirical tests usually support the basic stylised facts of internal labour markets for large organisations, they also recognise significant deviations from the standard model (see e.g. Creedy and Whitfield, 1988; Baker *et al.*, 1994; Trebe *et al.*, 2001; Grund, 2005; Eriksson and Werwatz, 2005; Hassink and Russo, 2008). In addition, the shift to a knowledge-based economy characterised by intense ICT-backed exchanges of information and goods, velocity, and outsourcing (Child and McGrath, 2001) underlines the growing importance of external forces in shaping levels and growth rates of internal wages (Blanchflower and Oswald, 1988; Lazear and Oyer, 2004; Dulebohn and Werling, 2007; Bayo-Moriones *et al.*, 2008 and 2011).

The availability of suitable data historically represented the main obstacle to empirical analyses of the wage policy at the firm level, as they require detailed information on employer and employee characteristics, wage levels, wage structure and wage dynamics. Most of the existing studies at the firm level are based on single or limited cases (Baker *et al.*, 1994; Grund, 2005; Lin, 2005) and consequently their output cannot be generalised. A new impulse to the study of wage policy patterns at the firm level comes from the growing availability of longitudinal matched employer-employee datasets (Eriksson and Werwatz, 2005; Lazear and Shaw, 2009a). The availability of detailed employee information linked with employer data for a wide set of firms promises to allow for the identification of general wage policies and their drivers.

This paper provides new insight on wage policy models at the firm level by exploring the wage policy patters displayed by a sample of Italian medium and large firms. The proposed exploratory empirical analysis identifies two distinct patterns of wage policy among sampled firms, i.e. High Payers and Low Payers. In addition, the paper outlines the drivers underpinning those patterns and provides preliminary evidence on the dynamics of wage policy at the firm level. The empirical analyses presented in this paper are part of the output of the research programme "Flexible wages for flexible contracts? The dynamics of the relationship between wage policy and employment contracts at the firm level", founded by the Portuguese Fundação para a Ciência e a Tecnologia[2]. Most of the existing analyses of wage policy models are based on econometric estimates where firm-level indicators of wage level, wage structure and wage dynamics play the role of either dependent variables (see, e.g., Eriksson and Werwatz, 2005) or independent variables (see, e.g., Cardoso, 2000; Brown *et al.*, 2003). In contrast, the research programme mentioned above resorted to cluster analysis to classify the wage policies adopted by sampled firms according to their degree of alignment with the ideal types identified in the literature. The advantage of cluster analysis is that it allows capturing non-linear interactions among key features of wage policy patterns that are hard to test in traditional empirical specifications.

The examination of the wage policy patters displayed by Italian medium and large firms is based on WHIP, a longitudinal dataset including a representative sample of employment relationships in private Italian firms between 1985 and 2004. Selected observations concern firms above 100 employees in 1989 and in 2004 and their employees. The results of the proposed empirical analyses show the existence of significant differences in the wage policy models adopted by the sampled firms. In addition, a non-negligible share of the observed firms changed their wage policy model between 1989 and 2004.

The rest of the paper is organised as follows. The next session briefly reviews the literature on wage policy at the firm level. Section 3 presents the data used in the empirical analysis, whereas the fourth section illustrates the output of the cluster analysis to classify wage policy patterns and sketches the dynamics observed between 1989 and 2004. Section 5 discusses the determinants of the identified wage policy patterns. The last section provides some concluding remarks.

---

[2] Suleman *et al.* (2013, this issue) report the outputs obtained by the Portuguese operative unit leading the FCT research programme.

2. WAGE POLICIES AT THE FIRM LEVEL

From the original roots in personnel economics the empirical research on the determinants of wage policy at the firm level has developed along two parallel lines characterised by different sources of data: personnel files from large companies on the one hand (for Lin, 2005), and matched employer-employee data on the other (Lazear and Shaw, 2009b).

Personnel files from large companies have been used to characterise the wage policy of single firms or a reduced number of firms over time (Baker *et al.*, 1994; Seltzer and Merret, 2000; Lin, 2005; Grund, 2005; Seltzer, 2010). Contributions based on personnel data highlight the stability of wage policy in time (Baker *et al.*, 1994), the relevance of the institutional setting (Grund, 2005; Seltzer, 2010) and the co-existence of typical features of the internal labour market with contrasting practices such as external recruitment at higher hierarchical levels (Baker *et al.*, 1994; Seltzer, 2010). Following the pioneer contribution by Medoff and Abraham (1981), some researchers used personnel data to test the neoclassical prediction that wage increases reflect growth in employee productivity (Lazear, 1998; Flabbi and Ichino, 2001; Dohmen, 2004). These studies suggest that individual productivity plays a minor role in explaining wage differentials, wage growth and rising seniority-wage profiles.

The studies based on matched employer-employee data focus on industry-specific, firm-specific and individual-specific sources of wage variability. The existing evidence is far from conclusive. For instance, Groschen (1991) argues that occupation-specific and establishment-specific effects explain over 90% of the wage variability observed in a sample of US employees from six industries. In contrast, based on French data Abowd *et al.* (1999) stress the prevalence of unobserved individual heterogeneity over firm effects in explaining individual wages.

The empirical evidence on firm-level wage policies of Italian firms has been limited so far. Flabbi and Ichino (2001) use personnel data from a large Italian retail banking firm to replicate and extend the analysis on the determinants of the wage-seniority profile developed by Medoff and Abraham (1981). Based on a range of direct measures of productivity (supervisors' evaluation, recorded absenteeism and misconduct episodes), Flabbi and Ichino (2001) show that the rising profile of wages with seniority depends on individual productivity only at the lowest hierarchical levels. Della Torre and Solari (2011) use a sample of over 3,300 Italian manufacturing firms to examine the impact of wage levels and intra-firm wage dispersion on employees' behaviour in terms of absenteeism and voluntary turnover. The results of the analysis suggest that the wage policy of firms has significant mediating and moderating effects on the relationship between the variable components of the reward system and employees' behaviour.

DINÂMIA'CET – IUL, Centro de Estudos sobre a Mudança Socioeconómica e o Território
ISCTE-IUL – Av. das Forças Armadas, 1649-026 Lisboa, PORTUGAL
Tel. 210464031 - Extensão 293100 E-mail: dinamia@iscte.pt www.dinamiacet.iscte.pt

5

Based on WHIP, the same dataset used in this paper, Contini *et al.* (2009) offer an overall picture of wage distribution and wage dynamics in Italy during the 1990s. The authors provide evidence in support of a significant differentiation of firm-level wage policies by showing the existence of a sizable within-firm wage dispersion that accounts for about two thirds of the total wage variance in the Italian private sector and is about twice the observed between-firm wage variability. The existence of a "tide rising all boats" effect suggests significant differences in pay levels. The higher the mean wage paid by a firm, the higher the mean wage paid across all occupations in that firm, but also the higher the observed within-firm wage dispersion. In addition, characteristics like gender, geographic area and industry account for a minor share of the total variance of wages, which seem to be driven by seniority and occupations.

Overall, the brief survey provided above suggest that firms implement differentiated wage policies that lead to different reward systems. However, additional research is needed to identify specific wage policy patterns and their implications for employers and employees. Researchers suggest that this goal may be pursued by enlarging the range of factors considered in the analysis of wage policy drivers to include occupations (Lazear, 1995) and workplace internal and external characteristics (Blanchflower and Oswald, 1988; Bayo-Moriones *et al.*, 2008 and 2011; Desjardins and Rubenson, 2011).

3. DATA

The identification of wage policy clusters is based on WHIP (Work Histories Italian Panel), a random sample of the archives of the Italian Institute for Social Security (INPS) that records the compulsory social allowances paid by employers in the non-agricultural private sector for their employees[3]. WHIP provides a dynamic panel including about 862,000 employment relationships held by about 350,000 individuals between 1985 and 2004. Information on employers concerns geographical location, sector of economic activity, annual average number of employees and firm age. Data on employees include age, sex and region of birth. For each employment relationship, identified by a unique code, WHIP provides information about start date, end date, gross reward per year, equivalent worked days per year, occupation, collective labour agreement in force, job level and administrative events that each year may affect an employment relationship, such as maternity leave or illness leave.

---

[3] WHIP samples the INPS archive by extracting the records on employees born either on March 10th, June 10th, September 10th or December 10th of each year. For a detailed description of WHIP see Leombruni *et al.* (2010).

Administrative data such as WHIP are based on objective measures and their reliability is cross-checked by all interested actors, including employers, employees and public officers. Thus they provide a more reliable source of information compared to survey data, as the latter are affected to a larger extent by subjective evaluation and measurement error.

The analysis proposed in this paper is based on pooled matched employer-employee data reported by WHIP in 1989 and 2004. Due to the limited differentiation of wage policies among smaller companies, the empirical analysis includes only larger firms, i.e. those over 100 employees. In addition, since WHIP reports a random selection rather than the universe of the individuals employed by Italian private firms, focus on larger firms allows increasing the number of employment relationships observed for each firm and year. Table 1 reports the number of firms and employees observed in 1989 and 2004, whereas Table 2 illustrates some descriptive statistics of the selected firms.

Table 1. Selected firms and selected employees

	1989	2004	Total
Selected firms	2,037	2,539	4,576
Selected employees	28,643	28,838	57,481
Total employment – Selected firms	2,364,552	2,618,966	4,983,518

Table 2. Selected firms: Descriptive statistics

	N	Mean	Std. Dev.
Firm size [employees]	4,576	1,089.06	3,415.80
Firm age [years]	4,317	19.77	11.71
Workforce age [years]	4,576	38.52	5.45
Gross hourly wage [€, base=2004]	4,548	10.56	3.68
Blue collar employees [%]	4,576	56.9%	37.0%
Female employees [%]	4,576	31.3%	28.9%
Part-timers [%]	4,576	8.8%	20.9%
Employees with permanent contract [%]	4,576	90.7%	19.5%

DINÂMIA'CET – IUL, Centro de Estudos sobre a Mudança Socioeconómica e o Território
ISCTE-IUL – Av. das Forças Armadas, 1649-026 Lisboa, PORTUGAL
Tel. 210464031 - Extensão 293100 E-mail: dinamia@iscte.pt www.dinamiacet.iscte.pt

7

4. CLUSTERS OF WAGE POLICIES

The cluster analysis used to identify the wage policy patterns adopted by sampled firms is based on a set of 13 variables that describe the wage policy of the firm in terms of wage level, wage structure and wage dynamics (Table 3).

Wage level, that "represents a firm's average compensation relative to that of other, competing organizations" (Brown *et al.*, 2003, p. 752), is synthesised by two variables[4]. The former is the mean gross hourly wage by firm (variable mean_hwage in Table 3); the latter is the ratio of the mean firm wage to the mean 2-digit industry wage (wage_position).

The wage structure, i.e. "the array of pay rates within the organization" that represents "the degree of slope in its pay policies" (Brown *et al.*, 2003, p. 753), is described by eight distinct indexes. The former two variables (the standard deviation of gross hourly wage, sd_hwage, and the Gini index of gross hourly wage dispersion, Gini_idx) assess overall wage dispersion at the firm level. The following two variables characterise wage variability across occupations and hierarchy by measuring the Spearman correlation between occupation and wage (occupation_wage_corr) and the Pearson correlation between tenure and wage (tenure_wage_corr). The mean gross hourly wage for the core (i.e., the modal) occupation (variable mean_hwage_corejob_stayers), the mean gross hourly wage for new entrants (mean_hwage_newentrants) and the wage differential between incumbents and new entrants (Entry_wage_gap) assess the preference of the firm for either internal competence development or recruitment from the external labour market. The last variable used to describe the wage structure of sampled firms is the average number of employees per job grade (Employees_per_jobgrade). This variable captures the compression of the hierarchical structure and it is measured as the ratio of the number of observed employees per firm to the number of distinct job grades reported by WHIP for those employees.

The last set of variables that enter the cluster analysis describes the wage dynamics of sampled firms. Indexes are calculated based on the wage differentials observed for firm stayers in two subsequent years (1988-1989 and 2003-2004, respectively). The first two variables measure the mean and the standard deviation of wage growth at the firm level (mean_wage_growth and sd_hwage_growth). The last variable assesses the elasticity of the mean wage to the regional unemployment rate and accounts for the sensitivity of firm-level wage policy to the economic cycle.

---

[4] All monetary values are expressed in euros, 2004 prices.

Table 3. The cluster analysis: Input variables

	Variable	Description
Wage level	mean_hwage	Average gross hourly wage
	wage_position	Ratio of average gross hourly firm wage to average gross hourly industry wage
Wage structure	sd_hwage	Standard deviation of gross hourly wage
	Gini_idx	Gini index of gross hourly wage dispersion
	occupation_wage_corr	Spearman correlation between occupation and wage
	tenure_wage_corr	Pearson correlation between tenure and wage
	mean_hwage_corejob_stayers	Mean hourly wage of firm stayers in core occupation
	mean_hwage_newentrants	Mean hourly wage of new entrants
	Entry_wage_gap	Wage differential between incumbents and new entrants
	Employees_per_jobgrade	Mean number of employees per job grade
Wage dynamics	mean_wage_growth	Mean gross hourly wage growth (firm stayers)
	sd_hwage_growth	Standard deviation of gross hourly wage growth (firm stayers)
	elasticity_over25	Elasticity of mean firm wage to regional unemployment rate for employees over 25 years of age

Cluster analysis was identified as a suitable tool to outline wage policy patterns, because it allows for non-linear interactions among different indicators. Cluster analysis is an ex-post multivariate identification technique that allows for bi-unique correspondence between firms and wage policy patterns. The specific clustering algorithm adopted is a two-step clustering procedure (Chiu *et al.*, 2001). The first step of the algorithm groups observations into preclusters based on a log-likelihood distance criterion. The second step applies standard hierarchical clustering to preclusters and identifies the optimal number of clusters as the solution that maximizes the increase in distance between the two closest clusters compared to the immediately less numerous solution.

Firm-level variables concerning wage level, wage structure and wage dynamics were calculated only when the WHIP dataset sampled at least 10 employees per firm and year. The number of observations available for the cluster analysis thus shrinks from 4,576 to 4,114. The use of a two-step clustering procedure with the variables described in the above section on the WHIP dataset identified two sets of wage policies as the solution characterised by the most statistically distinct clusters (Table 4). The first cluster includes 1,154 firms, whereas the second cluster counts 2,960 firms.

Based on the characteristics reported in Table 4, the two clusters were labelled with the conventional names of High Payers and Low Payers, respectively. High Payers provide their

DINÂMIA'CET – IUL, Centro de Estudos sobre a Mudança Socioeconómica e o Território
ISCTE-IUL – Av. das Forças Armadas, 1649-026 Lisboa, PORTUGAL
Tel. 210464031 - Extensão 293100 E-mail: dinamia@iscte.pt www.dinamiacet.iscte.pt

9

employees with higher mean hourly gross wages (14.86€ vs. 9.19€) and this is true also when focusing on employees in the modal occupation (12.88€ vs. 9.00€) and on new entrants (12.88€ vs. 8.06€). The wage policy of Low Payers matches the market of their 2-digit industry, as shown by the unitary value of the ratio of mean firm wage to mean industry wage[5]. In contrast, High Payers lead the market and pay mean wages about one time and a half the mean wage in the reference industry.

Wage dynamics is also accelerated for High Payers, with an average hourly wage increase of 1.16€ per year compared to 0.96€ for Low Payers. However, High Payers are characterised by much higher wage inequality, as shown by the higher standard deviation of wage level and wage growth and by the higher value assumed on average by the Gini index. Firm size being equal, firms in the High Payers cluster have leaner organisational structures, as shown by the higher number of employees per job grade. However, the stronger correlation between wage and occupation (0.699 for High Payers and 0.524 for Low Payers, respectively) suggests steeper wage growth along the internal hierarchy. In contrast, Low Payers display a stronger correlation index between tenure and wage (0.253 vs. 0.163).

Both Low Payers and High Payers display a negative elasticity of wages to the unemployment rate in the local labour market. Nevertheless, the absolute elasticity of the latter is much higher. A 1% increase in the regional unemployment rate is associated with a decrease of the gross wages of about 0.9% in the case of Low Payers and a decrease of over 2.5% in the case of High Payers.

Table 4. Clusters of wage policies

	High Payers N = 1,154		Low Payers N = 2,960		Total N = 4,114	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
mean_hwage	14.864	3.607	9.186	1.870	10.778	3.560
wage_position	1.526	0.385	1.003	0.203	1.150	0.356
sd_hwage	7.998	5.367	2.028	1.320	3.702	4.065
Gini_idx	0.256	0.109	0.115	0.057	0.155	0.099
occupation_wage_corr	0.699	0.172	0.524	0.231	0.573	0.230
tenure_wage_corr	0.163	0.448	0.253	0.449	0.228	0.451
mean_hwage_corejob_incumbents	12.879	4.416	9.001	1.953	10.089	3.354
mean_hwage_newentrants	12.880	4.280	8.602	1.948	9.802	3.400
Entry_wage_gap	3.097	4.921	0.839	1.284	1.473	3.001
Employees_per_jobgrade	5.499	15.107	3.136	2.667	3.799	8.380
mean_wage_growth	1.157	1.575	0.362	0.690	0.585	1.080
sd_hwage_growth	2.390	2.419	0.957	0.640	1.359	1.533
elasticity_over25	-2.548	5.344	-0.885	3.096	-1.351	3.932

---

[5] Due to selection criteria (at least 100 employees and at least 10employment relationships per year recorded in WHIP), mean firm size is much higher among selected firms than for the whole WHIP sample. The positive wage-size relationship (Contini *et al.*, 2009) explains why the pay rates of both High Payers and Low Payers are above their industry mean.

In 739 cases sampled firms that had over 100 employees and at least 10 employment relationships observed in WHIP in 1989 complied with the selection criteria also in 2004. Consequently, the wage policy of firms in this sub-sample was classified by the clustering algorithm in both the examined years and the dynamics of wage policy at the firm level between 1989 and 2004 can be observed. As reported in Table 5, 71% of firms display the same wage policy pattern at the two extremes of the observed time interval, with Low Payers showing a stronger propensity to maintain the initial wage policy model compared to High Payers (72.7% vs. 64.7%). However, and contrary to the prediction from empirical analyses with personnel records (Baker *et al.*, 1994), a non-negligible share of firms (28.9%) switches to a different wage policy pattern. Overall, firms in the High Payers cluster increase from 21.1% to 35.2% of the sub-sample.

Table 5. Dynamics of wage policy patterns

		Cluster membership in 2004		
		Low Payers	High Payers	Total
Cluster membership in 1989	Low Payers	424	159	583
	High Payers	55	101	156
	Total	479	260	739

5. WAGE POLICY DRIVERS

The probability of membership in the cluster High Payers is estimated via a binary model with a logistic cumulative distribution function in the following form:

$$P(HighPayer_i > 0 | X_i) = \frac{e^{\overline{X_i'}\overline{\beta}}}{1 + e^{\overline{X_i'}\overline{\beta}}} \, ,$$

where HighPayer is a binary variable that takes value 1 if a firm is classified in the cluster High Payers and 0 if it is classified in the cluster Low Payers; $\overline{X_i'}$ is the transposed vector of the values assumed by an array of firm-specific explanatory variables and $\overline{\beta}$ is the coefficient vector to estimate.

Table 6 reports the results of the regression estimate. The proposed regression explains a sizable share of the variance observed in the data (Nagelkerke R-Square = 0.433) and correctly classifies 81% of observations. In line with the findings of the literature (see, e.g., Contini *et al.*, 2009), firm size is a significant driver of the propensity to pay market leading wage rates. The

DINÂMIA'CET – IUL, Centro de Estudos sobre a Mudança Socioeconómica e o Território
ISCTE-IUL – Av. das Forças Armadas, 1649-026 Lisboa, PORTUGAL
Tel. 210464031 - Extensão 293100 E-mail: dinamia@iscte.pt www.dinamiacet.iscte.pt

11

larger the firm, the higher the odds of being a High Payer rather than a Low Payer. Workforce age has a similar impact on the dependent variable: the higher the mean age of employees, the higher the probability of membership in the cluster High Payers. In addition, as intuitively shown by the data in Table 5, the propensity to be a High Payer grows in time. The odds of being a member of the cluster High Payers in 2004 are more than twice compared to 1989.

Workforce tenure displays a negative impact on the probability of adopting a wage policy based on high wage levels and high wage dispersion. This finding suggests that the most required and best paid skills are characterised by a high degree of inter-firm transferability and that fast track careers probably develop across multiple employers. In line with prior findings of the literature, also the share of blue collar employees, the share of female employees and the share of part-time employees increase the probability that a firm will adopt a Low Payer wage policy model. Contrary to the intuition that the resort to temporary contracts involves low skilled and poorly paid workers, the coefficient of the share of permanent employees is negative, yet non statistically significant. Eventually, the results of the binary logistic estimate show that firms located in the Southern regions of Italy experience a stronger probability of adopting a wage policy based on the Low Payer model.

Table 6. The drivers of the probability to be a High Payer compared to a Low Payer

	β	Sig.	Exp(β)
ln(Firm size)	0.296	***	1.345
Mean workforce age	0.102	***	1.108
Mean workforce tenure	-0.033	*	0.968
Share of blue collar workers	-4.319	***	0.013
Share of female employees	-1.456	***	0.233
Share of part time employees	-1.818	***	0.162
Share of permanent employees	-0.045		0.956
Year=2004	0.721	***	2.056
North-East °	-0.149		0.861
Centre °	-0.181		0.834
South °	-0.645	***	0.524
Constant	-5.149	***	0.006

*Dependent variable: HighPayer; 4,013 observations; -2 Log likelihood = 3,338.7;
Nagelkerke R-Square = 0.433; Regression includes 6 binary variables for industry fixed effects;
°Reference category: North-West Italy
* Statistically significant at the .10 level; ** at the .05 level; *** at the .01 level.*

6. Concluding remarks

Based on a sample of medium and large Italian companies, the cluster analysis provided in this paper shows the existence of significantly differentiated wage policies at the firm level. Firms in the cluster of High Payers present leaner organisational structures with a comparably lower number of hierarchical levels and are market leaders in pay rates and wage raises. However, High Payers are also characterised by higher wage inequality, steeper wage differentials across occupations and stronger sensitivity to the conditions in the external labour market. The lower correlation between wage and tenure and the negligible differential between the wage of firm stayers in the modal occupation and the wage of new entrants suggest that High Payers are willing to recruit the skills and competence they need in the external labour market. In contrast with High Payers, Low Payers seem to privilege internal career paths through a stronger emphasis on wage-seniority rising profiles, more articulated hierarchical levels and sizable wage differentials between incumbent employees and new entrants. However, the alignment of provided pay levels with the prevailing wage rates in the reference industry contrasts with the development of internal skills according to the model of the internal labour market. In summary, the wage policy patterns identified by the cluster analysis do not align with the ideal types of the internal and the external labour markets hypothesised in the literature but rather present a mix of hybrid characteristics.

The proposed empirical analysis also underlines the existence of significant dynamic patterns in the wage policy models adopted by sampled firms. Contrary to prior literature findings that suggest strong persistence of wage policy at the firm level (Baker *et al.*, 1994), 28.9% of the firms sampled both in 1989 and 2004 switch to a different wage policy pattern and firms in the High Payers cluster increase from 21.1% to 35.2% of the sample in the examine time frame.

The analysis developed in this paper throws additional light on the characteristics of firm-level wage policy. Nevertheless, the proposed findings raise additional questions worth further investigation. What drives the change of wage policy pattern? Why does the propensity to be High Payers grow in time? How does the wage policy of a firm affect the development of employee career paths? The above questions are just few examples of additional related research issues in the area of firm-level wage policy whose exploration is now enabled by matched employer-employee data.

BIBLIOGRAPHICAL REFERENCES

ABOWD, J.M., Kramarz F., Margolis D.N. (1999), "High wage workers and high wage firms", *Econometrica*, 67(2): 251-333.

ATKINSON, A.B. (2007), "The distribution of earnings in OECD countries", International Labour Review, 16(1-2): 41-60.

BAKER, G., Gibbs M., Holmstrom B. (1994), "The Wage Policy of a Firm", The Quarterly Journal of Economics, 109(4): 921-955.

BAYO-MORIONES, A., Galdon-Sanchez J.E., Martinez-de-Moretin S. (2011), "The Process of Wage Adjustment: An Analysis Using Establishment-Level Data", IZA Discussion Paper No. 5598, Bonn: IZA.

BAYO-MORIONES, A., Galdon-Sanchez J.E., Martinez-de-Moretin S. (2008), "What Are the Factors Behind Pay Settlements? Evidence from Spanish and British Data", IZA Discussion Paper No. 3401, Bonn: IZA.

BLANCHFLOWER, D.G., Oswald A.J. (1988), "Internal and External Influences upon Wage Settlements", British Journal of Industrial Relations, 26(3): 363-370.

BROWN, M.P., Sturman M.C., Simmering M.J. (2003), "Compensation Policy and Organizational Performance: The Efficiency, Operational, and Financial Implications of Pay Levels and Pay Structure", The Academy of Management Journal, 46(6): 752-762.

CARDOSO, A.R. (2000), "Wage differentials across firms: An Application of multilevel modelling", Journal of Applied Econometrics, 15: 343-354.

CHILD, J., McGrath, R.G. (2001), "Organizations unfettered: Organizational form in an information-intensive economy", Academy of Management Journal, 44(6): 1135-1148.

CHIU, T., Fang D., Chen J., Wang Y., Jeris C. (2001), A Robust and Scalable Clustering Algorithm for Mixed Type Attributes in Large Database Environment, Proceedings of the seventh ACM SIGKDD international conference on knowledge discovery and data mining, 263.

DINÂMIA'CET – IUL, Centro de Estudos sobre a Mudança Socioeconómica e o Território
ISCTE-IUL – Av. das Forças Armadas, 1649-026 Lisboa, PORTUGAL
Tel. 210464031 - Extensão 293100 E-mail: dinamia@iscte.pt www.dinamiacet.iscte.pt

14

CONTINI, B., Leombruni R., Pacelli L., Villosio C. (2009), "Wage Mobility and Dynamics in Italy in the 90's", in Lazear E.P., Shaw K.L. (Eds.), The Structure of Wages: An International Comparison, Chicago: University of Chicago Press.

CREEDY, J., Whitfield K. (1988), "The economic analysis of internal labour market", Bulletin of Economic Research, 40(4): 247-268.

DELLA, Torre E., Solari L. (2011), "Workplace Pay Policies, Workers' Behaviour and Gender Implications in Italian Manufacturing Firms", DSLW Working Paper 1/2011, Università degli Studi di Milano, Dipartimento di Studi del Lavoro e del Welfare.

DESJARDINS, R., Rubenson K. (2011), "An analysis of skill mismatch using direct measures of skills", OECD Education Working Paper No. 63, EDU/WKP(2011)8, Paris: OECD.

DOERINGER, P., Piore M. (1971), Internal Labor Markets and Manpower Analysis, Massachusetts: Heath Lexington.

DOHMEN, T.J. (2004), "Performance, seniority, and wages: formal salary systems and individual earnings profiles", Labour Economics, 11: 741-763.

DULEBOHN, J. H., Werling S. E. (2007), "Compensation research past, present, and future", Human Resource Management Review, 17: 191-207.

ERIKSSON, T., Werwatz A. (2005), "The Prevalence of Internal Labour Markets - New Evidence from Panel Data", International, Journal of Economics Research, 2: 1-20.

FLABBI, L., Ichino A. (2001), "Productivity, seniority and wages: new evidence from personnel data", Labour Economics, 8: 359-387.

GROSHEN, E.L. (1991), "Sources of Intra-Industry Wage Dispersion: How Much Do Employers Matter?", The Quarterly Journal of Economics, 106(3): 869-884.

GRUND, C. (2005), "The wage policy of firms: comparative evidence for the US and Germany from personnel data", International Journal of Human Resource Management, 16(1): 104-119.

HASSINK, W., Russo G. (2008), "Wage differences between internal and external candidates", International Journal of Manpower, 29(8): 715-730.

Lazear E.P. (1995), "A Jobs-Based Analysis of Labor Markets", American Economic Association Papers and Proceedings, 85(2): 260-265.

DINÂMIA'CET – IUL, Centro de Estudos sobre a Mudança Socioeconómica e o Território
ISCTE-IUL – Av. das Forças Armadas, 1649-026 Lisboa, PORTUGAL
Tel. 210464031 - Extensão 293100 E-mail: dinamia@iscte.pt www.dinamiacet.iscte.pt

15

LAZEAR, E.P. (1998), Personnel economics: past lessons and future directions. Presidential address to the Society of Labor Economists, San Francisco, May 1st.

LAZEAR, E.P., Oyer P. (2004), "Internal and external markets: a personnel economics approach", Labour Economics, 11: 527-554.

LAZEAR, E.P., Shaw K.L. (2009a), "Wage Structure, Raises and Mobility: An Introduction to International Comparisons of the Structure of Wages Within and Across Firms", in Lazear E.P., Shaw K.L. (Eds.), The Structure of Wages: An International Comparison, Chicago: University of Chicago Press.

LAZEAR, E.P., Shaw K.L. (2009b), The Structure of Wages: An International Comparison, Chicago: University of Chicago Press.

LEOMBRUNI, R., Quaranta R., Villosio C. (2010), "Note di pubblicazione di WHIP v. 3.2", WHIP Technical Report no. 1/2010, Moncalieri: Laboratorio R. Revelli-Centre for Employment Studies.

LIN, M.J. (2005), "Opening the black box: the internal labor markets of company X", Industrial Relations, 44(4): 659–706.

MEDOFF, J.L., Abraham K.G., (1981), "Experience, performance and earnings", The Quarterly Journal of Economics, 95(4): 703-735.

SELTZER, A., Merrett D. (2000), "Personnel Policies at the Union Bank of Australia: Evidence from 1888-1900 Entry Cohorts", Journal of Labor Economics, 18(4): 573-613.

SELTZER, A.J. (2010), "Salaries and Promotion Opportunities in the English banking industry, 1890-1936", Business History, 52(5): 737-759.

SULEMAN, F., Lagoa S., Suleman A., Pereira M.L. (2013), "Firms' wage policies: new evidence from Portuguese linked employer-employee data", Portuguese Journal of Social Science, this issue.

TREBLE, J., van Gameren E., Bridges S., Barmby T. (2001), "The internal economics of the firm: further evidence from personnel data", Labour Economics, 8(5): 531-552.

WERNER, S., Werd S.G. (2004), "Recent compensation research: An eclectic review", Human Resource Management Review, 14: 201-227.

DINÂMIA'CET – IUL, Centro de Estudos sobre a Mudança Socioeconómica e o Território
ISCTE-IUL – Av. das Forças Armadas, 1649-026 Lisboa, PORTUGAL
Tel. 210464031 - Extensão 293100 E-mail: dinamia@iscte.pt www.dinamiacet.iscte.pt

16