

Wage Premia for Newly Hired Employees – Theory and Evidence*

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Abstract

We investigate wage differences between newly hired and incumbent employees. We show in a formal model that when employees care for wages as well as match-specific utility, incumbents earn less than movers if and only if firm-specific human capital is not too important. We then investigate a large data set on wages in German banks finding that relative wage premia for new recruits are larger on higher hierarchical levels where general managerial human capital is valuable as well as in areas such as investment banking and corporate banking where transferable client-specific human capital seems more important than firm-specific human capital.

Key Words: Wages, Job Mobility, Wage Premia

JEL Classification: J31, J44, J62

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1 Introduction

It is often claimed by practitioners that large wage increases can only be attained by employees when they move to a different employer. We want to investigate this claim theoretically as well as empirically.

First, we analyze a simple model. Firms in an industry compete against each other for the service of employees with given characteristics. An employee's utility is affected by his wage as well as by his personal well-being in his current job (for instance his fit to the corporate culture, his satisfaction with the work environment, supervisor or colleagues). The risk averse employee has private information about these personal preferences. However, while he receives wage offers from other firms, he is uncertain about his personal well-being at a potential new employer. We show that the current employer will always offer a lower wage to the employee than competing firms when the employee's human capital is not too firm specific. The reason is that risk averse agents are reluctant to move to new employers even when wages are higher. Hence, firms earn rents in a competitive labor market even when human capital is mainly general. Nonetheless, turnover occurs as employees move to different firms when they are less satisfied with the work environment. When comparing the wages of employees staying with their firm and with those who have been newly recruited by their employer we should therefore indeed observe that wages are higher for the new recruits. However, when human capital is very firm specific current employers may outbid potential rivals to ascertain that the employee stays with the firm with a sufficiently high probability and these specific skills are not lost.

To test our theoretical results we then investigate the wage premia paid to newly hired employees empirically. We use a large cross sectional dataset on compensation in the German banking and financial services sector provided by the management consultancy Towers Perrin. In 2005, 54 banks and financial service companies participated in the survey covering around 86,000 employees including all of the largest banks in Germany. The data set includes individual information on salary, age, firm tenure, hierarchical level, functional area, and region.

We indeed can confirm that in 2005 newly hired employees earned significantly higher wages than incumbents controlling for age, firm tenure, hierarchical level, functional area, region and company. We then study the influence of the hierarchical level and functional area on these wage premia. We find that wage premia are negative for lower levels but are positive and very substantial at higher levels where general managerial skills are more important relative to firm specific knowledge.

Moreover, wage premia differ significantly between functional areas. In line

with our model, wage premia are highest in investment banking and corporate banking where client specific human capital is of high importance which is general human capital in the sense that it is very valuable for other firms. Hence, firms pay high wage premia for newly hired employees to poach them from competitors.

Several studies discuss the impact of job mobility on individual earnings. Early contributions are for example Borjas (1981), Mincer (1986), or Ruhm (1987). Job mobility among younger employees is investigated by Topel and Ward (1992). Keith and McWilliams (1999) as well as Ransom and Oaxaca (2005) consider gender issues and Davia (2005) compares job and wage mobility across several countries. Other studies discuss the relation between internal and external labor markets, starting with Baker et al. (1994a), Baker et al. (1994b) and more recently e.g. Dohmen et al. (2004), Lazear and Oyer (2004a) or Lazear and Oyer (2004b).¹

Most closely related to our analysis is the study of Hassink and Russo (2003), who empirically investigate wage differences between incumbents and externally hired workers using a Dutch employer-employee matched data set. In contrast to our study they find no wage difference between incumbent workers and employees hired from other firms. Whereas they have information about the educational level and gender of each employee as well as previous labour market status of externally hired employees, their data set lacks detailed firm specific information about hierarchical levels and functional areas we can control for.

2 A Simple Model

2.1 Description of the Model

We first analyze a very simple model of an industry consisting of n firms indexed by k with $n \geq 3$ and a number of employees indexed by i . Each employee is qualified for exactly one type of job J and initially works in one of the firms. But in principle an employee can fill the same job in all firms in the industry. Hence, for each job all firms in the industry compete for the service of all employees who are qualified for the job. Consider a certain employee i working at a firm k . When staying with firm k the employee generates revenue $s_J \cdot a_i$ for his current employer. When moving to the same job in an other firm in the industry the new employer earns revenues of a_i . Hence, a_i can be interpreted as the employee's job specific ability and human capital and $s_J \geq 1$ measures the importance of firm specific human capital for the considered job J . For instance, when the

¹Our work is also related to the job-matching literature, see e.g. McCall (1990), whereas in these studies the focus is not so much on wage differences between incumbents and externally hired employees.

job mainly consists of managerial tasks and managerial competencies are rather general, s_J will be relatively small. But when it is for instance important for the job to know firm specific software or specific procedures s_J will be large. We assume that the job specific ability a_i is measurable by all potential employers. We further assume that a firm always benefits from employing an employee when the revenue generated by the employee exceeds the wage costs.

An employee i 's utility does not only depend on the wage he earns but also on other aspects of the job. We denote this match-specific utility when staying with firm k by u_{ik} . Of course, the employee knows this match-specific utility when staying with the firm but we assume that u_{ik} is private information of the employee and is unknown to the current employer as well as to other employers on the labor market. When he moves to a different firm $l \neq k$ it is drawn from a normal distribution with mean 0 and variance σ_u^2 and is unknown by the employee before his decision on whether to accept an external offer.² The employee's utility is additively separable in the wage and the match-specific utility and he is risk averse with constant absolute risk aversion. His Arrow-Pratt measure of absolute risk aversion is r .

The timing is as follows: First the current employer makes a wage offer to the employee, then other firms in the industry simultaneously make wage offers to the same employee. Finally, the employee decides on whether to stay with the initial employer or to move to a competing firm.

2.2 Equilibrium Analysis

Due to the competitive labor market, in equilibrium each employer makes a wage offer of $w_i^E = a_i$ to each external employee i . We now investigate the optimal wage offer made to an employee by his initial employer. Note that the certainty equivalent of the employee's utility when moving to a new employer is $a_i - \frac{1}{2}r\sigma_u^2$. Hence, employee i stays with his current employer k at a wage w_{ik} whenever

$$u_{ik} + w_{ik} \geq a_i - \frac{1}{2}r\sigma_u^2.$$

Hence, the employee stays with probability

$$P(w_{ik}) = 1 - F\left(a_i - \frac{1}{2}r\sigma_u^2 - w_{ik}\right).$$

Note that there will be always employee turnover between the firms in the industry. When considering the optimal wage paid to an incumbent employee firms now trade-off wage costs against the risk to lose the employee to a competitor.

²Hence, the match-specific utility is an experience good such as for instance in Jovanovic (1979).

Although moving to a different firm is risky, employees will do so when they are very dissatisfied with the current working conditions, i.e. u_{ik} is relatively small. The firm maximizes

$$\max_{w_{ik}} (s_J \cdot a_i - w_{ik}) \left(1 - F \left(a_i - w_{ik} - \frac{1}{2} r \sigma_u^2 \right) \right). \quad (1)$$

The first order condition is equivalent to

$$(-1) \left(1 - F \left(a_i - w_{ik} - \frac{1}{2} r \sigma_u^2 \right) \right) + (s_J \cdot a_i - w_{ik}) f \left(a_i - w_{ik} - \frac{1}{2} r \sigma_u^2 \right) = 0. \quad (2)$$

From this condition we can derive the following result:

Proposition 1 *The wage w_i^I offered to an employee by his current employer is characterized by*

$$w_i^I + \frac{1 - F \left(a_i - w_i^I - \frac{1}{2} r \sigma_u^2 \right)}{f \left(a_i - w_i^I - \frac{1}{2} r \sigma_u^2 \right)} = s_J \cdot a_i. \quad (3)$$

The wage paid to an incumbent employee w_i^I will be lower than that paid to a new hire of the same ability $w_i^E = a_i$ if and only if human capital is not too firm specific, i.e. when

$$s_J \leq 1 + \frac{1 - F \left(-\frac{1}{2} r \sigma_u^2 \right)}{a_i f \left(-\frac{1}{2} r \sigma_u^2 \right)}.$$

Proof:

Condition (2) can be directly rearranged to obtain (3). The normal distribution satisfies the monotone hazard rate condition, hence, $\frac{d}{dx} \left(\frac{f(x)}{1-F(x)} \right) > 0$ which implies that

$$\frac{1 - F \left(a_i - w_{ik} - \frac{1}{2} r \sigma_u^2 \right)}{f \left(a_i - w_{ik} - \frac{1}{2} r \sigma_u^2 \right)}$$

is strictly increasing in w_{ik} . Hence, (3) has a unique solution w_i^I . Moreover, the first derivative of (1) is strictly positive for $w_{ik} < w_i^I$ and strictly negative for $w_{ik} > w_i^I$. Hence, a necessary and sufficient condition for a positive wage premium paid to newly hired employees is that the first derivative of the objective

function (1) with respect to w_{ik} is negative at $w_{ik} = a_i$. This is the case when

$$\begin{aligned}
 -1 + F\left(-\frac{1}{2}r\sigma_u^2\right) + (s_J \cdot a_i - a_i) f\left(-\frac{1}{2}r\sigma_u^2\right) &< 0 \Leftrightarrow \\
 (s_J - 1) a_i f\left(-\frac{1}{2}r\sigma_u^2\right) &\leq 1 - F\left(-\frac{1}{2}r\sigma_u^2\right) \Leftrightarrow \\
 s_J &\leq 1 + \frac{1 - F\left(-\frac{1}{2}r\sigma_u^2\right)}{a_i f\left(-\frac{1}{2}r\sigma_u^2\right)}.
 \end{aligned}$$

■

Hence, when the competencies relevant for a certain job type are purely general human capital, i.e. employee's can switch between firms without productivity losses, incumbents always earn less in equilibrium than newly hired employees. The reason is the following: In the competitive labor market employees who leave their employer will be paid according to their productivity. When the current employer matches this outside offer he makes zero profits. A lower wage of course increases the probability that the incumbent leaves the firm. But when he stays, profits will be strictly positive. Hence, expected profits are only positive when incumbents are paid at a wage below the market level. It is interesting to note that this effect even arises when agents are risk neutral. However, the more risk averse the employee the lower can be the incumbent's wage as the switching costs due to the uncertainty about the new job are higher.

But when firm specific human capital is more important, market wages will be below the productivity of the employee in the current firm. Hence, the firm makes positive profits even at market wages. When firm specific skills are very important, paying only the market wage becomes too risky as agents with below average job satisfaction levels will be tempted to leave the firm. In equilibrium, the firm will then pay wages that exceed the market level to assure the employee's retention.

3 Empirical Investigation

3.1 The Data

We use a large dataset on compensation in the German banking and financial services sector³ for the years 2005 and 2004 provided by the management consultancy Towers Perrin. In 2005, 54 banks and financial service companies of every size located in Germany participated in the compensation survey covering

³Sparkassen, Volks- and Raiffeisenbanken and the Deutsche Bundesbank (Central Bank) are not part of the sample.

around 105,000 employees. In 2004 we have information about 43 firms and more than 95,000 employees. The survey participants report information for a variety of job positions in all relevant functional areas of the financial services sector. Note that there are no executive and senior management positions in the data set. Companies with less than 10 observations are excluded from statistical analysis.

We have individual information on salary, age, year of firm tenure with the current employer, hierarchical level (6 levels), functional area (8 areas), and region (15 regions) for selected employees of each participating company. In contrast to typical studies on job mobility information on the hierarchical level is quite precisely comparable across firms in the sample as Towers Perrin uses the career level methodology, a standardized evaluation method for all job positions occurring in the financial services sector. Career levels reflect different career steps for individuals from entry levels to senior expert positions for each function and job family. Then these career levels are aggregated resulting in four career ladders for management, professional, sales and support positions. Descriptive statistics are provided in Table A1 in the Appendix.

A common problem of data collected by compensation surveys is a potential selection bias. The large number of observations and job positions as well as the fact that we can identify each company by an anonymous company-specific identification number weakens this problem.

3.2 Results

As a starting point consider the OLS base regression results reported in Table 1. The dependent variable is the logarithm of wage (base salary) and the dummy variable *Newly hired* indicates that an employee has been hired in the relevant year. We control for age, age squared, hierarchical level, functional area, and geographic region. Column (1) of Table 1 shows that the coefficient for a new hire in the year 2005 is positive and significant. Hence, newly hired employees on average earned about 3,1%⁴ more than an incumbent employee of the same age and on the same job.

But it is important to note that this wage premium drops to about 1.2% in model (2) where we additionally include company specific dummy variables. A possible explanation would be that those companies which hired more employees also paid higher wages. Hence, when we control for company effects the wage premium is still positive but seems to be rather small on average. Columns (3) and (4) of Table 1 show regression results for the year 2004. The coefficient

⁴Note that log wage increases by $[(e^\beta - 1) * 100]$ percent, see e.g. Halvorsen and Palmquist (1980).

Dependent variable:	Logarithm of Base Salary			
	2005		2004	
	(1)	(2)	(3)	(4)
Newly hired	0.0310*** (0.0050)	0.0118** (0.0049)	0.0203*** (0.0052)	-0.000305 (0.0047)
Age	0.0319*** (0.00043)	0.0329*** (0.00040)	0.0307*** (0.00042)	0.0301*** (0.00039)
Age ² *100	-0.0315*** (0.00054)	-0.0330*** (0.00050)	-0.0302*** (0.00053)	-0.0298*** (0.00049)
Level 6 ^a	1.028*** (0.0051)	1.011*** (0.0049)	1.026*** (0.0048)	1.025*** (0.0045)
Level 5	0.711*** (0.0028)	0.697*** (0.0026)	0.732*** (0.0027)	0.743*** (0.0025)
Level 4	0.514*** (0.0021)	0.501*** (0.0019)	0.522*** (0.0020)	0.529*** (0.0019)
Level 3	0.342*** (0.0019)	0.326*** (0.0017)	0.351*** (0.0018)	0.348*** (0.0016)
Level 2	0.181*** (0.0018)	0.166*** (0.0015)	0.181*** (0.0016)	0.182*** (0.0015)
Asset Management ^b	0.164*** (0.0067)	0.137*** (0.0066)	0.203*** (0.0069)	0.119*** (0.0071)
Corporate Banking	0.0685*** (0.0024)	0.0553*** (0.0022)	0.0336*** (0.0024)	0.0171*** (0.0021)
Corporate Production	0.0439*** (0.0013)	0.0288*** (0.0013)	0.0285*** (0.0013)	0.00336*** (0.0013)
Corporate Services	0.000856 (0.0012)	-0.0127*** (0.0012)	-0.0196*** (0.0011)	-0.0428*** (0.0011)
Investment Banking	0.188*** (0.0064)	0.147*** (0.0063)	0.164*** (0.0068)	0.105*** (0.0062)
Private Banking	0.0388*** (0.0021)	0.0242*** (0.0019)	0.0187*** (0.0020)	-0.00254 (0.0017)
Treasury and Capital Markets	0.139*** (0.0036)	0.113*** (0.0034)	0.219*** (0.0053)	0.160*** (0.0047)
Regional effects	Yes	Yes	Yes	Yes
Company effects	No	Yes	No	Yes
R-squared	0.80	0.83	0.82	0.85
Observations	94312	94312	87885	87885

^a Reference category: Level 1, ^b Reference category: Retail Banking

*** p<0.01, ** p<0.05, * p<0.1, Robust standard errors in parentheses

Table 1: OLS wage regressions 2005 and 2004

for newly hired employees is again positive and significant, but slightly smaller than in 2005. But including company specific dummy variables in model (4) indicates that there is, on average, no wage premium for newly hired employees in 2004 in the base regression.

So far we have estimated the average wage premium across all levels and functional areas. Recall that our model made a prediction on the difference between the wages of new recruits and incumbents with the same job specific human capital. But there is an important difference between the lowest levels in the hierarchy, i.e. the typical ports of entry, and the higher hierarchical levels in this respect.

Table A2 in the Appendix provides an overview over the proportion of employees, i.e. new recruits and incumbent employees, per hierarchical level. Due to the career level approach we know that levels 1 and 2 are the ports of entry for former apprentices and university graduates. But we can rule out that there are employees without professional experience on levels 3 to 6. In both years the proportion of employees who are newly hired relative to the population of each hierarchical level is highest on level 1, followed by level 2 in 2004. The situation is somewhat different in the year 2005, as there are relatively high turnover rates on the highest levels. Across all levels, labor turnover lies between 1.52% and 1.80%. The mean age of new recruits on entry levels is around 26 years on level 6 and 31 years on level 5.

Incumbents on the lowest levels directly will have more human capital than young graduates without prior experience on the labor market due to a longer job tenure. Hence, we should expect that newly hired employees are less productive and earn less on these levels. This is indeed confirmed by the regression reported in Table A3 in the Appendix considering only entry levels 1 and 2: We observe that newly hired employees earn about 2.4% less than incumbents on these levels. This result seems to be robust over both years, as the coefficients are significant and almost identical.

This problem does not exist on the higher hierarchical levels. On these levels new recruits are not young graduates but already have prior job experience comparable to that of the incumbent employees. Note that we control for the employees' age, which can be used as a proxy for this experience. To exclude young graduates without prior experience from further analysis we drop entry levels 1 and 2. Column (1) of Table 2 reports a wage regression considering only the highest levels 3 to 6 in the year 2005, controlling for age, functional area, region, and company effects. On average newly hired employees now earn about 3% more than incumbents on these levels. This is confirmed by the results in column (6), as the coefficient for newly hired employees in 2004 is almost identical.

Dependent variable:	Logarithm of Base salary									
	2005 (1)	2005 (2)	2005 (3)	2005 (4)	2005 (5)	2004 (6)	2004 (7)	2004 (8)	2004 (9)	2004 (10)
Newly hired	0.0298*** (0.0065)	-0.0535*** (0.0100)	-0.0705*** (0.010)	-0.0854*** (0.019)	-0.0557*** (0.010)	0.0282*** (0.0082)	-0.00643 (0.011)	-0.0116 (0.011)	-0.0234 (0.018)	-0.00475 (0.011)
Newly hired × Level 6	0.193*** (0.034)	0.193*** (0.034)	0.216*** (0.035)	0.230*** (0.037)	0.213*** (0.034)	0.187*** (0.061)	0.187*** (0.061)	0.192*** (0.063)	0.210*** (0.067)	0.174*** (0.060)
Newly hired × Level 5	0.171*** (0.020)	0.171*** (0.020)	0.188*** (0.020)	0.194*** (0.026)	0.179*** (0.020)	0.131*** (0.027)	0.131*** (0.027)	0.130*** (0.028)	0.133*** (0.031)	0.136*** (0.026)
Newly hired × Level 4	0.110*** (0.013)	0.110*** (0.013)	0.129*** (0.013)	0.143*** (0.020)	0.115*** (0.013)	0.0138 (0.015)	0.0138 (0.015)	0.0204 (0.015)	0.0400* (0.021)	0.0117 (0.015)
Management ^a					0.0811*** (0.0043)					0.0646*** (0.0050)
Professional					-0.0552*** (0.0052)					-0.0474*** (0.0058)
Sales					0.0689*** (0.0050)					0.0639*** (0.0053)
Age	0.0279*** (0.00073)	0.0275*** (0.00073)	0.0241*** (0.00072)	0.0234*** (0.0012)	0.0273*** (0.00071)	0.0202*** (0.00069)	0.0201*** (0.00069)	0.0182*** (0.00067)	0.0164*** (0.00078)	0.0203*** (0.00068)
Age ² *100	-0.0259*** (0.00086)	-0.0254*** (0.00086)	-0.0218*** (0.00085)	-0.0195*** (0.0013)	-0.0254*** (0.00084)	-0.0173*** (0.00082)	-0.0171*** (0.00082)	-0.0152*** (0.00079)	-0.0128*** (0.00091)	-0.0175*** (0.00080)
Level 6 ^b	0.670*** (0.0045)	0.666*** (0.0046)	0.599*** (0.0048)	0.624*** (0.0051)	0.590*** (0.0048)	0.673*** (0.0043)	0.671*** (0.0043)	0.633*** (0.0043)	0.634*** (0.0043)	0.608*** (0.0046)
Level 5	0.364*** (0.0021)	0.361*** (0.0021)	0.295*** (0.0025)	0.331*** (0.0031)	0.329*** (0.0023)	0.395*** (0.0021)	0.394*** (0.0021)	0.357*** (0.0021)	0.360*** (0.0022)	0.366*** (0.0023)
Level 4	0.171*** (0.0012)	0.169*** (0.0012)	0.112*** (0.0017)	0.158*** (0.0026)	0.158*** (0.0013)	0.179*** (0.0012)	0.179*** (0.0012)	0.139*** (0.0014)	0.146*** (0.0015)	0.173*** (0.0013)
Collective wage agreement			-0.0961*** (0.0018)					-0.120*** (0.0019)		
Observations	59724	59724	59724	38851	59729	54147	54147	54147	44172	54147
R-squared	0.70	0.71	0.72	0.65	0.72	0.73	0.73	0.75	0.74	0.75

Additional control variables are functional areas, region and company in all specifications

^a Reference category: Support, ^b Reference category: Level 3

*** p<0.01, ** p<0.05, * p<0.1, Robust standard errors in parentheses

Table 2: OLS wage regressions for levels 3 to 6

But of course it is important to differentiate further between the various levels. In general, we expect that managerial skills and talent will become more and more important the higher the hierarchical level. But managerial talent is mostly general human capital. Our simple model therefore suggests that wage premia for new recruits are increasing in the hierarchical level. To test this prediction we add interaction terms between each hierarchical level and the dummy variable indicating whether an employee is newly hired to the regression model. Our conjecture is indeed confirmed by the results reported in column (2) of Table 2. The size of the wage premia for new recruits in 2005 strongly depends on the hierarchical level.

As level 3 is the reference category, the coefficients for the interaction terms measure the difference in the new recruits' wage premia relative to that premium in level 3. First note that the coefficient for *Newly hired* becomes negative when the interaction terms are included. Hence, on level 3 newly hired employees still earn less than their incumbent counterparts and this difference is sizeable at about -5.2%. But already on level 4 new recruits receive a 6% wage premium relative to incumbents and this premium becomes 12.5% on level 5 and about 15% on the highest level 6. In 2004, only the interaction terms for the highest levels 5 and 6 are significant, i.e. newly hired employees on these levels earn higher wages than incumbents.

In German banks many employees are covered by collective wage agreements which impose a restriction on market wages. The vast majority of pay scale employees in our data set is located on hierarchical levels 1, 2 and 3. We investigate the effects of collective wage agreements in columns (3) and (4) of Table 2 for the year 2005 and in columns (8) and (9) for the year 2004. In model (3) and (8) we control for the existence of a collective wage agreement and find that the results are mainly unchanged. In model (4) and (9) we drop all employees covered by a collective wage agreement from the data set. As a result, the difference on level 3 between an incumbent and a new recruit increases up to -8.2% in 2005. Hence, this difference must be smaller when employees are covered by a collective wage agreement indicating that the minimum wage character of a collective wage agreement here seems to favor new recruits. The wage premia on higher levels are almost equal to those in model (2) with pay scale and non-pay scale employees. The situation on the highest levels 5 and 6 in 2004 is similar. Thus, we do not distinguish whether an employee is covered by a collective wage agreement in further regressions.

We are also able to compare the wage premia between the different functional areas in the considered banks and financial services companies. Table 3 shows the results of a wage regression where we interact the dummy for a new hire with the different functional areas. As reference group we have chosen retail banking

Dependent variable:	Ln Base salary	
	2005 (1)	2004 (2)
Asset Management ^a	0.143*** (0.0071)	0.138*** (0.0077)
Corporate Banking	0.0589*** (0.0023)	0.0344*** (0.0023)
Corporate Production	0.0214*** (0.0016)	0.0179*** (0.0014)
Corporate Services	-0.0236*** (0.0020)	-0.0281*** (0.0019)
Investment Banking	0.142*** (0.0066)	0.118*** (0.0066)
Private Banking	0.0226*** (0.0020)	0.0105*** (0.0018)
Treasury and Capital Markets	0.143*** (0.0046)	0.180*** (0.0049)
Newly hired	-0.0528*** (0.018)	-0.0382** (0.016)
Newly hired × Asset Management	0.0438 (0.035)	0.0546 (0.042)
Newly hired × Corporate Banking	0.158*** (0.029)	0.214*** (0.054)
Newly hired × Corporate Production	0.0991*** (0.019)	0.0669*** (0.019)
Newly hired × Corporate Services	0.0619** (0.030)	0.0418 (0.031)
Newly hired × Investment Banking	0.169*** (0.040)	0.201*** (0.049)
Newly hired × Private Banking	0.0853*** (0.030)	0.0273 (0.032)
Newly hired × Treasury and Capital Markets	0.111*** (0.029)	0.157*** (0.038)
Age	0.0279*** (0.00073)	0.0201*** (0.00069)
Age ² * 100	-0.0259*** (0.00086)	-0.0172*** (0.00082)
Observations	59724	54147
R ²	0.71	0.73

Additional control variables are region, hierarchical level and company

^a Reference category: Retail Banking

*** p<0.01, ** p<0.05, * p<0.1, Robust standard errors in parentheses

Table 3: Wage premia in the different functional areas

as this is the largest functional area covering around 34% of total employees working in it. It is quite interesting to note that there are substantial differences between the functional areas that are quite robust over both years. Wage premia are negative in retail banking, whereas the interaction terms for asset management are not statistically significant. Positive and economically significant wage premia can be found in investment banking, corporate banking, or treasury and capital markets in both years. It is quite obvious that employees in investment banking and treasury and capital markets not only earn on average the highest absolute wages, but also new recruits in these areas receive higher wage premia compared to other functional areas. Of course, the data must be interpreted carefully in this respect as industry specific trends may influence these results. But still, it seems as if the observations may quite well be understood by the reasoning suggested in our model. Note that investment banking and corporate banking are characterized by human capital that is much more *client specific* than firm specific. But client specific human capital is general human capital in the sense that it is very valuable for a competitor. Hence, firms will be willing to pay high wages to lure investment and corporate bankers away from their competitors. Table A4 in the appendix shows separate regressions for each functional area including interaction terms with the hierarchical level.

Our data set has an additional unique feature that allows another test of the predictions of the simple model. The consultancy Towers Perrin distinguishes between four different career ladders. Here we investigate the *managerial* and the *professional* ladder. The managerial ladder includes employees in supervisory roles with mainly managerial tasks whereas the professional ladder encompasses functional experts. Columns (5) and (10) of Table 2 report regression results including dummy variables for the career ladders used in the data set. Compared with the base regressions in Columns (2) and (7) the coefficients are almost identical. Hence, controlling for functional area, region, company, age, hierarchical level and career ladder there are still wage differences between incumbent and newly hired employees.

Dependent variable:	Logarithm of Base salary							
	2005				2004			
	Management (1)	Management (2)	Professional (3)	Professional (4)	Management (5)	Management (6)	Professional (7)	Professional (8)
Newly hired	0.0772*** (0.018)	-0.117 (0.11)	0.0402*** (0.0070)	-0.0223** (0.010)	0.0735*** (0.027)	-0.181*** (0.063)	0.0419*** (0.0094)	0.0364*** (0.013)
Newly hired × Level 6		0.222* (0.12)		0.235*** (0.038)		0.314*** (0.089)		0.142 (0.098)
Newly hired × Level 5		0.225** (0.11)		0.135*** (0.023)		0.335*** (0.086)		0.0799*** (0.028)
Newly hired × Level 4		0.166 (0.11)		0.0613*** (0.013)		0.197*** (0.068)		-0.0266 (0.018)
Age	0.0189*** (0.0019)	0.0188*** (0.0019)	0.0254*** (0.0010)	0.0250*** (0.0010)	0.0194*** (0.0020)	0.0192*** (0.0020)	0.0226*** (0.00098)	0.0225*** (0.00098)
Age ² *100	-0.0139*** (0.0022)	-0.0137*** (0.000022)	-0.0234*** (0.0012)	-0.0229*** (0.000012)	-0.0143*** (0.0022)	-0.0142*** (0.000022)	-0.0202*** (0.0012)	-0.0201*** (0.000012)
Level 6 ^a	0.641*** (0.0088)	0.637*** (0.0088)	0.598*** (0.0079)	0.589*** (0.0080)	0.623*** (0.0089)	0.621*** (0.0089)	0.620*** (0.0077)	0.618*** (0.0077)
Level 5	0.364*** (0.0076)	0.361*** (0.0075)	0.356*** (0.0028)	0.352*** (0.0028)	0.371*** (0.0077)	0.369*** (0.0077)	0.383*** (0.0030)	0.382*** (0.0030)
Level 4	0.188*** (0.0071)	0.186*** (0.0071)	0.169*** (0.0016)	0.168*** (0.0016)	0.184*** (0.0070)	0.184*** (0.0070)	0.179*** (0.0018)	0.180*** (0.0018)
Observations	9660	9660	32116	32116	8574	8574	29208	29208
R-squared	0.76	0.76	0.67	0.67	0.75	0.75	0.68	0.68

^a Reference category: Level 3

Additional control variables are functional area, region and company

*** p<0.01, ** p<0.05, * p<0.1, Robust standard errors in parentheses

Table 4: OLS wage regressions by career ladder

As argued already above, managerial skills are mostly general human capital. On the other hand, among the experts in the professional ladder firm specific knowledge should be more important for individual productivity. Hence, we expect that wage premia for external recruits are higher when we consider only jobs in the managerial ladder. To investigate this claim empirically we ran separate wage regressions for both career ladders. The results are reported in Table 4. We indeed find that wage premia are higher in the managerial ladder with about 8% on average across the levels 3 to 6 in 2005 and 4% in the professional ladder across these levels. As the coefficients for the year 2004, reported in Columns (3) and (4) of Table 4 are almost identical to those for 2005, these results seem to be robust over both years.

4 Conclusion

First, we analyzed a simple model, in which firms compete for the service of employees. An employee's decision to stay with his current employer or to move to a different firm depends on the wages offered as well as his personal current job satisfaction. The uncertainty about the job satisfaction in a new firm leads to switching costs. We have shown that when firm human capital is mainly general, firms will offer higher wages to new recruits than they pay to comparable incumbents.

When firm specific human capital is more important, however, this is no longer clear. In that case a competitor's willingness to pay is lower than the value of the employee for the current employer. But paying only this market wage to an incumbent agent is too risky as agents with lower levels of current job satisfaction may well leave the firm and move to a different employer. Hence, incumbent employees may earn more than new recruits on the same position.

We then tested these predictions empirically using a large data set on wages in German banks and financial service companies. We found that newly hired employees earn more than incumbents on higher levels of the hierarchy where managerial skills which are rather general are more important. Moreover, we found that these hiring premia are large in functional areas where human capital is often client specific rather than firm specific.

Many interesting tasks remain for further research. Mainly, a more detailed analysis of the importance of firm specific skills in different functional areas would be useful. Moreover, a panel investigation tracking the wages of new recruits over longer periods should lead to other interesting insights.

References

- Baker, G. P., M. Gibbs, and B. Holmström (1994a). The internal economics of the firm: Evidence from personnel data. *Quarterly Journal of Economics*, 881–919.
- Baker, G. P., M. Gibbs, and B. Holmström (1994b). The wage policy of a firm. *Quarterly Journal of Economics*, 921–955.
- Borjas, G. (1981). Job mobility and earnings over the life cycle. *Industrial and Labor Relations Review* 34, 365–376.
- Davia, M. (2005). Job mobility and wage mobility at the beginning of the working career: A comparative view across europe. *ISER Working Paper 2005-03*.
- Dohmen, T. J., B. Kriechel, and G. A. Pfann (2004). Monkey bars and ladders: The importance of lateral and vertical job mobility in internal labor market careers. *Journal of Population Economics* 17, 193–228.
- Halvorsen, R. and R. Palmquist (1980). The interpretation of dummy variables in semilogarithmic equations. *American Economic Review* 70, 474–75.
- Hassink, W. and G. Russo (2003). Wage differences between incumbents and external candidates. *Utrecht School of Economics Discussion Paper 03-03*.
- Jovanovic, B. (1979). Job matching and the theory of turnover. *Journal of Political Economy* 87, 972–90.
- Keith, K. and A. McWilliams (1999). The returns to mobility and job search by gender. *Industrial and Labor Relations Review* 52, 460–477.
- Lazear, E. and P. Oyer (2004a). The structure of wages and internal mobility. *American Economic Review* 94, 212–16.
- Lazear, E. P. and P. Oyer (2004b). Internal and external labor markets. *Labour Economics*.
- McCall, B. P. (1990). Occupational matching: A test of sorts. *Journal of Political Economy* 98, 45–69.
- Mincer, J. (1986). Wage changes in job changes. In *Research in Labor Economics*, Volume 8, pp. 171–197. JAI Press.
- Ransom, M. and R. L. Oaxaca (2005). Intrafirm mobility and sex differences in pay. *Industrial and Labor Relations Review* 58, 219–37.

Ruhm, C. (1987). The economic consequences of labor mobility. *Industrial and Labor Relations Review* 41, 30–42.

Topel, R. and M. Ward (1992). Job mobility and the careers of young man. *Quarterly Journal of Economics* 107, 439–479.

5 Appendix

Variables	2005			2004		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Ln Base Salary	105204	10.818	0.314	94446	10.790	0.312
Age	105204	39.60	9.09	95938	39.24	9.27
Age squared	105204	1651.14	735.08	95938	1625.345	750.681
Newly Hired	105204	0.018	0.133	96209	0.015	0.122
Hierarchical levels:						
Level 6 (highest level)	105204	0.026	0.158	96371	0.024	0.152
Level 5	105204	0.111	0.314	96371	0.098	0.297
Level 4	105204	0.256	0.437	96371	0.256	0.437
Level 3	105204	0.243	0.429	96371	0.228	0.420
Level 2	105204	0.265	0.442	96371	0.282	0.450
Level 1 (lowest level)	105204	0.099	0.299	96371	0.113	0.316
Functional areas:						
Asset Management	105204	0.012	0.107	96371	0.012	0.110
Corporate Banking	105204	0.055	0.227	96371	0.065	0.246
Corporate Production	105204	0.247	0.431	96371	0.238	0.426
Corporate Services	105204	0.253	0.435	96371	0.245	0.430
Investment Banking	105204	0.012	0.109	96371	0.011	0.102
Private Banking	105204	0.042	0.200	96371	0.061	0.239
Retail Banking	105204	0.340	0.474	96371	0.344	0.475
Treasury and Capital Markets	105204	0.040	0.195	96371	0.024	0.153

Table A1: Descriptive statistics

Hierarchical level	2005						2004								
	Employees ^a		Age ^b		Tenure ^b		Employees ^a		Age ^b		Tenure ^b				
	Incumbents	Newly hired	Incumbents	Newly hired	Incumbents	Newly hired	Incumbents	Newly hired	Incumbents	Newly hired	Incumbents	Newly hired			
6	2640 (97.67%)	63 (2.33%)	46.04	40.86	15.80	2261 (98.95%)	24 (1.05%)	46.49	40.04	17.33	9283 (98.94%)	99 (1.06%)	43.65	38.99	16.70
5	11432 (98.26%)	203 (1.74%)	43.27	37.99	15.37	24392 (98.96%)	256 (1.04%)	41.08	36.12	15.10	21706 (98.94%)	233 (1.06%)	38.48	32.72	14.11
4	26511 (98.37%)	440 (1.63%)	41.46	35.33	14.85	26763 (98.64%)	368 (1.36%)	37.49	30.55	13.52	10345 (95.57%)	479 (4.43%)	36.66	25.86	11.05
3	25114 (98.26%)	446 (1.74%)	38.76	33.30	13.66	94750 (98.48%)	1459 (1.52%)	39.36	31.05	14.19	10345 (95.57%)	479 (4.43%)	36.66	25.86	11.05
2	27534 (98.64%)	381 (1.36%)	38.28	30.43	13.88	94750 (98.48%)	1459 (1.52%)	39.36	31.05	14.19	10345 (95.57%)	479 (4.43%)	36.66	25.86	11.05
1	10080 (96.55%)	360 (3.45%)	36.10	25.76	10.52	94750 (98.48%)	1459 (1.52%)	39.36	31.05	14.19	10345 (95.57%)	479 (4.43%)	36.66	25.86	11.05
Total	103311 (98.20%)	1893 (1.80%)	39.74	32.51	13.96	94750 (98.48%)	1459 (1.52%)	39.36	31.05	14.19	94750 (98.48%)	1459 (1.52%)	39.36	31.05	14.19

^a Absolute and in % of respective level (in brackets), ^b Mean

Table A2: Proportion of newly hired and incumbent employees and distribution of age and tenure per hierarchical level

Dependent variable:	Ln Base salary	
	2005	2004
Newly hired	Lowest levels -0.0243*** (0.0066)	Lowest levels -0.0235*** (0.0053)
Age	0.0412*** (0.00046)	0.0405*** (0.00047)
Age ² *100	-0.0452*** (0.00059)	-0.0443*** (0.00061)
Level 2 ^a	0.163*** (0.0015)	0.178*** (0.0015)
Observations	34588	33738
R ²	0.69	0.67

^a Reference category Level 1

Additional control variables are functional area, regional and company

*** p<0.01, ** p<0.05, * p<0.1, Robust standard errors in parentheses

Table A3: OLS wage regressions regarding only entry levels 1 and 2

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Asset Management	Corporate Banking	Corporate Production	Corporate Services	Investment Banking	Private Banking	Retail Banking	Treasury & Capital Markets
Level 6 ^a	0.642*** (0.033)	0.619*** (0.0092)	0.673*** (0.0079)	0.745*** (0.018)	0.667*** (0.031)	0.630*** (0.011)	0.629*** (0.0083)	0.740*** (0.020)
Level 5	0.378*** (0.027)	0.329*** (0.0064)	0.371*** (0.0031)	0.444*** (0.0085)	0.366*** (0.018)	0.330*** (0.0062)	0.291*** (0.0036)	0.492*** (0.011)
Level 4	0.194*** (0.018)	0.166*** (0.0049)	0.174*** (0.0019)	0.194*** (0.0033)	0.169*** (0.015)	0.155*** (0.0037)	0.133*** (0.0021)	0.235*** (0.0085)
Newly hired	-0.00881 (0.050)	0.0135 (0.049)	-0.0221* (0.012)	-0.0114 (0.025)	0.00525 (0.032)	0.0449 (0.039)	-0.111*** (0.022)	-0.0159 (0.036)
× Level 6	0.153 (0.14)	0.228** (0.092)	0.135*** (0.047)		-0.0241 (0.075)	0.0853 (0.081)	-0.0340 (0.077)	0.194** (0.080)
× Level 5	0.0901 (0.062)	-0.00245 (0.059)	0.136*** (0.031)	0.162** (0.079)	0.216** (0.091)	-0.0437 (0.066)	0.229*** (0.052)	0.0916* (0.052)
× Level 4	0.0265 (0.066)	0.0229 (0.056)	0.0614*** (0.016)	0.0376 (0.053)	0.134*** (0.051)	-0.0272 (0.047)	0.204*** (0.029)	0.0243 (0.045)
Age	0.0623*** (0.015)	0.0175*** (0.0025)	0.0238*** (0.0012)	0.0273*** (0.0016)	0.0486*** (0.0088)	0.0150*** (0.0022)	0.0344*** (0.0012)	0.0370*** (0.0043)
Age ² *100	-0.0579*** (0.018)	-0.0119*** (0.0029)	-0.0207*** (0.0014)	-0.0263*** (0.0019)	-0.0426*** (0.011)	-0.0113*** (0.0026)	-0.0344*** (0.0015)	-0.0393*** (0.0052)
Observations	1026	4687	23091	8921	1079	3999	14275	2646
R ²	0.69	0.77	0.67	0.66	0.67	0.78	0.67	0.71

Additional dummy variables are region and company

*** p<0.01, ** p<0.05, * p<0.1, Robust standard errors in parentheses

Table A4: OLS wage regressions 2005 by functional area