

Wages, Experience and Tenure: Evidence from Displaced Workers*

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- VERY PRELIMINARY -

Abstract

This paper provides estimates of the average returns to total labour market experience, industry- and firm-specific tenure. Using longitudinal information on workers and firms, the contribution of the above factors to the overall wage growth is identified. Results indicate that blue collars have flatter wage-experience profiles than white collars. Match specific capital seems to contribute to raise returns to firm tenure for white collars.

Keywords: Wages, Experience, Seniority, Sector Tenure, Search, Matching, Human Capital.

JEL Classification: J31, J41.

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1 Introduction

This paper provides estimates of the average returns to experience, industry- and firm-specific tenure for a sample of young Italian workers in the early stages of their careers. Studying the process of job and wage mobility turns out to be interesting for a couple of reasons. It gives a picture of the overall individual growth of wages over the life-cycle. It also provides a test of the human capital model and its main implication in terms of accumulation (and loss) of such capital. Finally it contributes to the general debate about the trend of wage inequality identifying the returns to observable and unobservable factors in the labour market. [Here say something about Borgarello and Devicienti, 2002 and wage dispersion in general.]

Using longitudinal information on workers and firms, the individual contributions of total labour market experience, industry-specific tenure and firm-seniority to the overall wage growth are identified. Human capital is accumulated through a process of learning by doing that determines wage growth. Returns to human capital are assumed to differ across workers/cohorts. [Here something about Gosling, Machin and Meghir (2000) and cohort effects.] Firms offer different career profiles and workers are allowed to search for better matches. Since there are match-specific effects on wages, they choose the firm with the preferred learning by doing characteristics.

However, the empirical strategy to be adopted to estimate the average returns to the above factors has to deal with all the three forms of endogeneity, i.e., omitted variables problem, simultaneity and measurement error. For our purposes we just take into account the first two. (In Administrative Data, measurement errors and attrition are less relevant.) In particular, it is the correlation between unobserved variables in the error term and one or more elements on the right hand side of the wage equation that causes lack of identification. The upward bias in the returns to experience is predicted by search and matching models that postulate that experience is positively correlated with the unobserved job match component. [Important to note that Topel (1991) argues that the correlation between tenure and unobserved match component can be negative because of selection due to voluntary quits.] For individual heterogeneity, the correlation is negative with experience and positive with tenure. The overall results indicate that the experience bias is ambiguous while the tenure bias is positive, unless one is ready to accept Topel's (1991) argument.

The literature dealing with the estimation of returns to tenure and experience is huge and still no consensus has been reached about the magnitude of returns to those factors. [Note about surveys.] Early studies based on simple OLS regressions indicate very large returns to tenure and experience when no control for individual heterogeneity is taken into account (Usually around 3.5% per year.). However, controlling for previous labour market history can substantially reduce the effect of experience and seniority on earnings (Mincer and Jovanovic, 1981).

Recognising the bias deriving from individual and firm heterogeneity, other authors have proposed different estimators to take into account the problems of selection and endogeneity of the tenure and experience variables. Abraham and Farber (1987) and Altonji and Shakokto (1987) propose instrumental variables to deal with the correlation between individual unobserved components of the error term and tenure and experience. Their results indicate that once controlling for such factors, returns to tenure are almost nil in magnitude, and are equal to 0.67% per year. The magnitude of average returns to tenure in an OLS equation is re-established by Topel (1991). Using information on workers that start a new job as identification strategy, he calculates a lower bound for the returns to tenure obtaining an average return of 2.8% per year. Altonji and Williams (1997) survey previous findings and argue that Topel's results are due to the sample used [Insert something about this paper].

More recently, the attention has been devoted to the importance of sector tenure in the determination of wage growth. Neal (1995) and Parent (2000) provide interesting results about the importance of industry-specific capital when estimating the returns to experience and firm-specific tenure. [Something about their results.] [Something about Italy.]

This paper uses an estimation method recently proposed by Dustmann and Meghir (2003) to identify the average returns to experience, sector- and firm-specific tenure. The wage equation to be estimated depends on experience, calculated as the total number of months (effectively) worked since entry in the labour market, the duration of tenure in the industry (sector tenure) and the sum of months worked by the same employer (no matter if interrupted by temporary spells of unemployment). Population average returns to experience and tenure are identified given individual and firm behaviour. The identification approach is based on using displaced workers following firm closure. [Something more about the use of such samples in the literature, Rosolia 2002 and Farber 2003] This allows to distinguish between wage growth attributable to learning by doing to wage growth due to endogenous mobility in search for better matches. However, as Dustmann and Meghir (2003) highlight, even for displaced workers, job acceptance and labour market experience are endogenous when starting a new job. To overcome this problem, a control function estimator is used. Age as excluded instrument is imposed to allow for endogeneity and allowing for heterogeneous returns to experience, sector tenure and firm tenure.

The data used in this study is from the Italian Administrative Social Security Archive (INPS). Detailed information about labour market histories of workers employed in the private sector is available for the period 1985-1996. Demographic characteristics of workers are matched with relevant information about the firm they are currently working at, as sector of activity, average number of employees and age of firm. Given the longitudinal structure of the data, it is possible to track the entire career of workers and easily construct the variables object of study. Information about daily and yearly wages are available as the total

number of days paid during the year, allowing to construct a measure of monthly wage directly comparable across workers. [Some references about the data set and the construction of variables in general in note.] From the dataset, I extract a subsample of workers that entered the labour market between 1985 and 1995. I use a sample of very young workers (younger than 25 at entry) to study wage growth in early stages of the careers as in this period most of wage increase takes place. I limit my attention to male workers and separate the analysis for blue collars and white collars.

The main findings are as follows. Descriptive evidence suggests that mobility rates in the Italian labour market are reasonably similar to those for other European countries (see Dustmann and Meghir, 2003). Interesting patterns emerge looking at differences between blue and white collars. The average number of jobs held by year of experience indicates that on average workers have about three jobs after 5 years in the labour market, with higher figures for blue collars. Interestingly, the mobility process indicates that around 85% of changers find a job after two years; 60% of white collars stay in unemployment for less than one month. Surprisingly, displaced workers seem to have higher chances to re-enter the labour market, 75% of them make job-to-job transitions. Sector mobility reveals also interesting differences between job changers and displaced workers. In this case, displaced workers are more likely to find a job in the same sector, indicating that some sector-specific skills are not transferable. The descriptive picture of mobility is completed looking at average wage growth of workers by year of experience. Results indicate that stayers have a somewhat flatter wage-experience profile and that initial higher wage growth for movers can be due to higher variance of alternative wages for workers at the beginning of their career. As experience accumulates the gap declines and average wage growth gets almost the same for movers and changers. Matching considerations seem also to play a role. However, the pattern shows interesting differences when comparing blue and white collars. The latter seem to be positively selected and experience some wage gains upon moving to new jobs.

Descriptive results are completed by estimations for average returns to experience, seniority and sector tenure taking into account of heterogeneity and endogeneity. The analysis is carried out separately for blue and white collars. The former exhibit an average return that is increasing for all the specifications adopted. However, considering only previously displaced workers, returns to experience are significantly reduced. This is most true when selection and endogeneity are also taken into account; in this case, after five years of experience, blue collars get a stable return of 1% per year. Wage profiles are definitely steeper for white collars. Interestingly, job changers seem to be positively selected as they have better career prospects in the new firms. For these workers, the control function approach doesn't seem to help a lot. Although returns are reduced compared to OLS estimates, they are not really significant. What clearly emerges is that returns are increasing with years of experience up to four years, and then

decline afterwards. This evidence can indicate that their career are more stable and that matching considerations are relatively less important for them. (However this contradicts descriptive evidence.) On the other hand, an important role is played by sector-tenure. This is particularly true for white collar workers, that have persistently higher returns to sector tenure. Combined with the previous result for experience, these figures indicate that white collars benefit from a learning by doing process and enjoy a great part of their lifetime wage growth while on the job. Finally, returns to tenure are estimated. For blue collars, taking the sample of displaced workers, I find that returns to tenure are negative during the first three years, but then increase constantly to reach 9% during the years 6-9. However, these effects are not statistically significant. Controlling for endogeneity and selection, substantial returns to tenure are found. During the first three years those returns are equal to 5%, and even during the next three years they persist. Results for white collars indicate also important tenure effects. The OLS estimates indicate an average return to tenure of 6% during the first 3 years, those returns then decline to 2% afterwards. Wage growth effect show the same pattern as for blue collars. with a negative return associated with job change and displacement, but with a consistent recover afterwards. Finally, controlling for endogeneity and selection effects quite large and substantial tenure effects emerge. After 9 years at the same firm, wages increase by 30%.

The increase in returns to tenure can be the effect of a reallocation of returns from experience to tenure, since returns to experience decline substantially after controlling for selection and search. The increase in returns to tenure over time seem to be due to the shift between experience and tenure. The increase in the returns to tenure when correcting for selection is consistent with a matching model, where workers with a high individual effect in the return to tenure have stronger incentive to move and match with a better firm if the improvement is such to counteract the returns to tenure.

The rest of the paper is organised as follows. Section 2 briefly discusses the literature and the econometric framework that is adopted to overcome known problems with the estimation of average returns to experience and tenure. Section 3 is dedicated to the descriptive analysis of job and wage mobility and to the interpretation of the results from wage equations. Section 4 concludes providing further research ideas.

2 Literature and Methodology

2.1 Related Studies

Many studies pointed out that comparing wages of workers with different levels of experience gives biased results for the returns to experience. There are two main reason for this. The first is that different levels of experience can be the result of

the fact that workers that are longer in the labour market are in better matches. The second is the underlying heterogeneity in the population of workers: high ability workers are likely to have a stronger labour market attachment and hence more experience. An additional source of bias encountered when estimating the average returns to experience is that workers with higher returns to experience are likely to spend less time out of the labour market because the opportunity cost of not working is higher. This determines that experience and returns to experience are positively correlated.

OLS estimates are upward biased because they do not take into account the sorting that occurs when high wage workers have lower mobility rates. The bias is given by the negative correlation between individual specific components (transferable across firms) and turnover probabilities. Hence, theories that emphasise the importance of those characteristics should be considered.

The issue has been first studied by Mincer and Jovanovic (1981); using OLS correlations between wages and tenure on the job from cross section and panel data, they conclude that there are large returns to seniority. After controlling for previous number of changes as a measure of worker heterogeneity they establish that returns are substantially reduced. On the other hand, fixed effects estimates and differencing constitute another route to identify returns to tenure and experience (Bartel and Borjas, 1981).

During the 1980s, several studies looked in greater detail at this issues. Main references are Abraham and Farber (1987), Altonji and Shakotko (1987). The main conclusion that emerges from these studies is that wages do not grow with seniority. On the other hand, Topel (1991) argues that there are substantial returns to job seniority, and that the magnitude of these returns is of the same size as the one provided by simple OLS estimates. Topel (1991) argues that previous research's results were driven by inappropriate methods and data. He suggests estimating the returns to experience by using wages of those starting a new job and who have zero tenure. However, this sample of workers is composed of different categories: those that quitted from the previous job to get an higher wage, those that have been fired from the previous employer, and those that have been displaced because the firm closed down and prefer the new job to unemployment. Topel (1991) obtains quite high returns to tenure. Altonji and Williams (1997) argue that those results are basically due to three different facts. The first is basically a data problem, in the sense that tenure and wage variables are not synchronised, i.e. they refer to different years; the second is again related to the use of a different dataset to detrend the data; finally the third is due to the use of two different estimators.

Dustmann and Meghir (2003) resolve some of the problems using a sample of displaced workers. The intuition behind their paper is the following: If we assume that firm closure is exogenous conditional on observables, then workers that have been displaced are a random sample of the workforce [NOTE ABOUT FIRING AGREEMENTS IN ITALY] and are not selected into new jobs on the

basis of their past choices, but just because the job is preferable to unemployment. The problem of ability bias still remains because experience is correlated with the permanent part of the unobservables. In other words, the tendency of individuals who are more productive, or have higher returns to experience, to spend more time in employment generates a bias because they have more experience for each level of potential experience. Moreover, only those workers receiving good enough offers will accept the job. In the paper, the proposed solution is the use of age effects as exclusion restrictions combined with a control function estimator on displaced workers. Residuals from experience and participation reduced forms equations correct for endogenous job acceptance and experience.

It is important to stress that the identification strategy for average returns to experience and tenure is based on displaced workers. In this context, the authors argue it is possible to distinguish between wage growth due to learning by doing from wage growth due to endogenous job mobility, which leads to improved job matches. [Importance of exogenous displacement to control for selection due to unobserved heterogeneity.] Still there is the problem of endogeneity of experience and acceptance of a new job. To solve it, age is used as an excluded instrument. [Control function estimator with residual terms is used.]

2.2 Econometric Framework

Much of the debate on the true returns to tenure has focused on the appropriate econometric methods to deal with the endogeneity of the tenure variable. However, as Parent (2000) suggests, less attention has been paid to the fact that total labour market experience is not only characterised by total prior experience and firm seniority; a third component to be added to the wage regression is the total time spent working in a particular sector, i.e., sector tenure. It is then interesting to study the effect of this inclusion on the firm-specific tenure variable.

Consider the following wage equation

$$\ln w_{ijkt} = \beta_0 OJ_{ijt} + \beta_1 T_{ijt} + \beta_2 X_{ijt} + \beta_3 S_{ikt} + \alpha_i + \theta_{ij} + \gamma_{ik} + \epsilon_{ijt}, \quad (1)$$

where w_{ijkt} is the real wage for worker i , working at firm j in sector k at period t . X , T , and S denote total labour market experience, firm tenure and sector tenure respectively. OJ is a binary variable equal to one if tenure is greater than one (see Altonji and Shakotko, 1987). [For expositional reasons I do not include any other control variable or non linear terms in experience, tenure and sector tenure.]

Unobserved heterogeneity can be decomposed in an individual specific fixed effect (α_i), θ_{ij} is a fixed job match component, and γ_{ik} is a fixed unobserved component that reflects the quality of the match between the worker and the industry. The above specification includes unmeasured individual ability, the quality of the employment relationship and unobserved quality of the match

between the worker and the sector. This representation of the error term allows to take into account different aspects not observed by the econometrician that turn out to be relevant in the process of wage determination and to be correlated to experience and tenure.

The problem in estimating the wage equation by OLS is that the unobserved components are likely to be correlated with the total labour market experience, tenure and sector-specific tenure. High ability workers with high values of α can be in careers less frequently interrupted by unemployment; long lasting better matches are more likely to be formed as experience (in the form of human capital) accumulates and search in the labour market has been exerted for longer (Burdett, 1979). The latter effect gives a correlation between θ and experience and between γ and sector tenure. Instrumental variables approaches permit to instrument tenure, experience and sector-tenure with their deviations from the mean. By construction those instruments are not correlated with the unobservable part related to individuals. However, they do not correct for the correlation with the unobserved job-match component. The correlations between experience and tenure, and between sector- and firm-tenure arise as a result of job shopping over the career. More sector-tenure in a particular industry can help locating a better match in the sector. Even if controlling for total labour market experience, this can bias upwards the estimate of sector-tenure. On the other hand, since firm-tenure is strongly correlated with sector-tenure, the estimate of firm seniority will be biased down.

3 Results

This section provides some evidence regarding the job mobility process in my sample. I start with some comments about descriptive statistics. In Figure ??, I report the average number of jobs held in the labour market for each year of experience for blue and white collars. For blue collars, the average number of job increases quite rapidly until the sixth year, then we can observe a little decrease in the slope. White collars workers hold fewer jobs, after 5 years in the market they have less than 2.5 jobs against 3 for blue collars. These number are quite close to those reported by Dustmann and Meghir (2003) for Germany, while are certainly quite different from those found by Topel and Ward (1992) for the US. [Insert something about Brugiavini and Brunello]

In Table 1 I report re-entry probabilities both for all movers and for displaced workers. Both groups are characterised by quite short periods of unemployment. About 50% of total job changers move directly to a new job, the figure for blue collars is higher, with almost 60% of transitions directed to a new employer. However, it is interesting to note that more than 10% of movers don't find a job after two years. Figures for displaced workers are reported in panel B. More than 60% of blue collars go directly to a new job, while 74% of white collars stay in

Table 1: Elapsed Time in Unemployment after Displacement

Six months periods	blue collars	white collars
job changers		
job to job	49.77	60.16
6 mths	15.66	10.78
12 mths	10.74	7.56
18 mths	6.61	5.07
24 mths	4.27	3.81
more displaced	12.95	12.62
job to job	59.33	74.68
6 mths	14.01	7.74
12 mths	8.42	5.08
18 mths	5.48	2.90
24 mths	3.28	2.58
more	9.48	7.02

Table 2: Within and Between Sectors Mobility

	blue collars	white collars
New Firm/Same Sector	51.71	52.24
New Firm/New Sector	48.29	47.76
New Firm/Same Sector (Displaced)	59.94	63.41
New Firm/New Sector (Displaced)	40.06	36.59

unemployment for less than a month. This figures probably reflect the effect of advance notice policies at work.

In Table 2 the process of job mobility within the same and across different sectors is reported. Interesting different patterns emerge when looking at difference among blue collars and white collars and when comparing the gross number of changers and only displaced workers. Considering all movers, it emerges that almost half of these workers change the sector when changing job, no remarkable differences among categories emerge. On the other hand, displaced workers are less likely to change sector, even if a consistent part of moves is still characterised by a switch (40% for blue collars and 36% for white collars).

Figure ?? analyses wage dynamics for three groups of workers: stayers, movers and sector movers. The average growth of monthly wages by years of experience indicates that stayers have a somewhat flatter profile with a flattening after the first year in the market. Between jobs average wage growth is higher in the first years, as the average growth for those that change sector. However, the difference in wage growth between movers and stayers declines as experience increases. This

Table 3: Wages and Number of Jobs, OLS

	blue collars	white collars
2nd Job	0.0106*	-0.0098*
3rd Job	0.0138*	-0.0187*
4th Job	0.0095*	-0.0340*
5th Job	0.0091*	-0.0446*
6th Job	0.0126*	-0.0769*
7th Job	0.0117*	-0.0990*

* denotes significance at 5% levels.

Table 4: Wages and Number of Jobs, Fixed Effects

	blue collars	white collars
2nd Job	0.0007	0.0127*
3rd Job	-0.0060*	0.0269*
4th Job	-0.0148*	0.0153*
5th Job	-0.0252*	0.0003
6th Job	-0.0344*	0.0066
7th Job	-0.0394*	-0.0235*

* denotes significance at 5% levels.

fact can be interpreted as higher variance of wages accepted by those that move in early stages of their careers. The matching process can account for these facts whereas workers have not sorted themselves in their preferred matches. [Comment on figures.]

Gains from moving decline with the number of jobs held, indicating that the incentive for improving matches declines with experience. The fact that movers get some gains from changing job is predicted by search theory. However, this doesn't necessarily imply that on average movers earn more than stayers. To verify this conjecture, in Table 3 I regress the log of monthly wage on the number of jobs held including age and year dummies. Those that have more jobs earn on average lower wages, this is particularly true for white collars while for blue collars the pattern is not monotonic. The same regression is presented in Table 4 including individual fixed effects. Now the association between the number of jobs and wages looks a bit different. Blue collars seem to be negatively selected, while more productive white collars seem to be those that move more to get some wage gains, at least up to 4 jobs.

[Here something about firms and closure. Given the importance of firm closure information for the identification strategy adopted in this paper, some warnings are in order. In particular, selection of workers in these firms is quite important. An important issues is that of the survival probability of firms, so that a survivor

Table 5: Wage Growth - Experience, Blue Collars

	OLS			Control Function Estimator	
	Whole Sample	All New Jobs	New Jobs after Displacement	All New Jobs	New Jobs after Displacement
1 year	0.0365 (0.0020)	0.0208 (0.0036)	0.0170 (0.0097)	0.0239 (0.0036)	0.0184 (0.0097)
2 years	0.0428 (0.0020)	0.0290 (0.0040)	0.0218 (0.0104)	0.0383 (0.0044)	0.0282 (0.0110)
3 years	0.0494 (0.0022)	0.0329 (0.0044)	0.0164 (0.0109)	0.0484 (0.0053)	0.0281 (0.0127)
4 years	0.0511 (0.0024)	0.0367 (0.0049)	0.0260 (0.0121)	0.0591 (0.0065)	0.0441 (0.0152)
5 years +	0.0111 (0.0005)	0.0087 (0.0010)	0.0067 (0.0024)	0.0139 (0.0014)	0.0108 (0.0033)
N	214,563	54,308	10,312	54,308	10,312

Standard errors are in parentheses.

function is essential. Then the evolution of average employment for firms that are known to close down by age at closure. Attention to the age composition of firms should be paid. A cohort effect is necessary to eliminate the latter effect: younger firms are smaller and more likely to die. Then eventually add something about average wages of those that stay and those that do not stay. Robustness check and sensitivity analysis are necessary.]

The estimation method consists of three reduced forms, one for experience, one for participation and one for firm-tenure. Experience is defined as the number of years (including fraction of years) worked until the date of observation. Participation is defined as the fraction of year in employment [Note about the alternative definition and LFS]. Finally tenure is defined as the total number of years worked at the same firm. All reduced forms include age indicators, time and cohort effects, and some interactions. Reduced forms are estimated separately for blue and white collars.

All wage equations include as conditioning variable indicators time dummies. In what follows, I present estimates for 5 different estimation methods: OLS on the whole sample, OLS for those starting a new job (as Topel, 1991), OLS on the sample of those starting a new job after displacement, the control function approach using the entire sample of new jobs and including the residual terms, and finally the control function approach on those that start a new job after displacement. The control function approach should control for endogeneity and selection.

Experience is modelled as a set of annual indicators for the first five years, and as a linear after that. All regressions include sector tenure, modelled as a linear spline at 5 years or between 5 and 10 years. Let's start with blue collars. Table 5 contains the results. In column 1 OLS estimates indicate that one year of experience gives a return of 3.6%. However, returns to experience increase constantly until the fourth year, with a return of 5%. When considering only those workers that change jobs, as Topel (1991) suggests, returns to experience decrease quite substantially, and lose some significance. After 4 years of experience, displaced workers enjoy half of the returns, that is 2.6%. Notice that standard errors get larger as we control for exogenous displacement. These results do not indicate that blue collar movers are positively selected, and that search behaviour is important. However, the pattern is not very clear because using the sample of displaced workers, returns are reduced. In column 4, the sample of all movers is used again controlling for participation and experience decisions. The main result is that of slightly reducing return to experience in the first three years but to increase returns in later years. The final column uses the sample of displaced workers and residuals from previous reduced forms. The effect is that of strongly reducing returns to experience. One year of experience in the labour market provides a return of 1.8%, exactly half the value found in column 1 for OLS estimates. Comparing results across columns it emerges that controlling for exogenous displacement significantly reduces returns to experience. After five years workers get a stable return of 1%. Moreover, selection and endogeneity correction help to correctly estimate true returns to experience. In our sample of blue collar workers, returns to experience do not seem to be much related to improved matches, and workers do not seem to improve much their wages upon move.

As reported in Table 6, for white collars the picture changes quite a lot. First of all the significance of all coefficients is reduced for all estimation methods. On the other hand, white collars have much higher returns to experience. After a modest return of 2% in the first year, then returns grow constantly and reach 10% after 4 years in the OLS regression. The same figures are even higher for those that change the job. This contrast with the pattern found for blue collars that experienced lower returns after changing jobs. This fact can indicate that white collars are positively selected when changing jobs. In this case, controlling for previous participation decisions doesn't help a lot, coefficients are almost the same as in previous columns. Finally, the sample of displaced workers with correction gives not significant effects in the first three years of experience. Selection and endogeneity effects matter less for white collars, this can reflect the fact that they have shorter and fewer periods out of work.

To summarise, these findings suggest that for blue collar workers wages grow with experience but the profile is quite flat. White collars receive lower wages initially but have steeper wage profiles afterwards. The fact that selection and endogeneity controls are less important for them can indicate that they have more

Table 6: Wage Growth - Experience, White Collars

	Whole Sample	OLS		Control Function Estimator	
		All New Jobs	New Jobs after Displacement	All New Jobs	New Jobs after Displacement
1 year	0.0221 (0.0041)	0.0245 (0.0084)	0.0100 (0.0256)	0.0231 (0.0085)	0.0087 (0.0257)
2 years	0.0567 (0.0042)	0.0468 (0.0095)	0.0188 (0.0268)	0.0457 (0.0104)	0.0169 (0.0278)
3 years	0.0869 (0.0046)	0.0881 (0.0107)	0.0583 (0.0290)	0.0848 (0.0127)	0.0571 (0.0323)
4 years	0.1003 (0.0051)	0.1127 (0.0118)	0.0891 (0.0313)	0.1024 (0.0155)	0.0845 (0.0379)
5 years +	0.0218 (0.0010)	0.0282 (0.0024)	0.0207 (0.0063)	0.0250 (0.0034)	0.0193 (0.0085)
N	57,107	11,055	2,252	11,055	2,252

Standard errors are in parentheses.

Table 7: Wage Growth - Sector Tenure

	Whole Sample	OLS		Control Function Estimator	
		All New Jobs	New Jobs after Displacement	All New Jobs	New Jobs after Displacement
blue collars					
5 years	0.0179 (0.0004)	0.0238 (0.0008)	0.0266 (0.0019)	0.0239 (0.0008)	0.0264 (0.0019)
5 - 10 years	-0.0255 (0.0008)	-0.0074 (0.0025)	-0.0164 (0.0052)	-0.0076 (0.0025)	-0.0163 (0.0052)
N	214,563	54,308	10,312	54,308	10,312
white collars					
5 years	0.0325 (0.0009)	0.0221 (0.0020)	0.0338 (0.0049)	0.0207 (0.0020)	0.0326 (0.0050)
5 - 10 years	0.0049 (0.0015)	0.0146 (0.0053)	0.0363 (0.0114)	0.0140 (0.0053)	0.0355 (0.0114)
N	57,107	11,055	2,252	11,055	2,252

Standard errors are in parentheses.

Table 8: Wage Growth - Firm Tenure

	OLS			Control Function Estimator	
	Whole Sample	All New Jobs	New Jobs after Displacement	All New Jobs	New Jobs after Displacement
blue collars					
3 years	0.0287 (0.0006)	-0.0237 (0.0045)	-0.0024 (0.0071)	0.0574 (0.0042)	0.0644 (0.0084)
3 - 6 years	0.0102 (0.0009)	0.0612 (0.0148)	0.0240 (0.0173)	0.0658 (0.0111)	0.0759 (0.0151)
6 - 9 years	0.0131 (0.0016)	0.0678 (0.0372)	0.0959 (0.0398)	0.0461 (0.0272)	0.0549 (0.0320)
N	214,563	54,102	10,283	54,308	10,312
white collars					
3 years	0.0640 (0.0013)	-0.0287 (0.0094)	-0.0038 (0.0166)	0.1107 (0.0097)	0.0898 (0.0215)
3 - 6 years	0.0237 (0.0017)	0.1095 (0.0396)	0.1032 (0.0499)	0.0574 (0.0319)	0.1066 (0.0472)
6 - 9 years	0.0217 (0.0027)	0.1949 (0.1366)	0.1603 (0.1525)	0.3038 (0.1070)	0.2755 (0.1330)
N	57,107	11,203	2,246	11,055	2,252

Standard errors are in parentheses.

stable careers and that matching consideration are less important for this group of workers.

I now turn to discussing estimation of returns to sector tenure. Results are obtained from the same regressions as before and are reported in Table 7. The variable is modelled as a linear spline at 5 years intervals. Blue collars enjoy returns of staying at the same sector in the first five years of about 2%. Returns to tenure after 5 years become slightly negative. These results are common to all specifications provided. For white collars, on the other hand, sector tenure returns are persistently positive, even if decreasing after 5 years. The OLS specification in column 1 indicates 3% return to tenure during the first 5 years and then almost nil. Controlling for endogeneity and selection effects increases significantly the returns to 3.5% for the second five years. Combined with previous results from experience, these figures seem to indicate that as far as transferable (?) skills are concerned, white collars enjoy quite higher wage growth from learning by doing. Blue collars on the other hand do not enjoy high returns to those general skills. [Here insert something about endogeneity of the sector switch.]

In Table 8, I provide results for my estimation of average returns to tenure. I fit a linear spline at three years interval. As suggested by Dustmann and Meghir (2003), columns 1, 4 and 5 are based on levels, while 2 and 3 are based on wage growth within the firm [CHECK]. Results for blue collars are discussed first. From the OLS regression we find that returns to tenure are quite high during the first three years on the job (2.8%) and then decrease to 1% afterwards. When regressing the wage growth on the new jobs we find negative returns in the first three years and then an increase afterwards. However, taking the sample of displaced workers, I find that returns to tenure are negative during the first three years, but then increase constantly to reach 9% during the years 6-9. However, it should be noted that those effects are not statistically significant. Finally, controlling for endogeneity and selection, in columns 4 and 5, I find substantial returns to tenure. During the first three years those returns are equal to 5%, and even during the next three years they stay the same. Results for white collars indicate important tenure effects. The OLS estimates indicate an average return to tenure of 6% during the first 3 years, those returns then decline to 2%. Wage growth effect in columns 2 and 3 show the same pattern as for blue collars with a negative return associated with job change and displacement, but with a consistent recover afterwards. Finally, controlling for endogeneity and selection effects, in column 4 and 5, I find quite large and substantial tenure effects. After 9 years at the same firm, wages increase by 30%. The increase in returns to tenure can be the effect of a reallocation of returns from experience to tenure, since returns to experience decline substantially after controlling for selection and search effects. The increase in the returns to tenure when correcting for selection is consistent with a matching model, where workers with a high individual effect in the return to tenure have stronger incentive to move and match with a better firm if the improvement is such to counteract the returns to tenure.

In conclusion, returns to tenure are quite high when compared with returns to sector tenure and experience. This effect is stronger for white collars, and this seems to be the fundamental source of wage growth. Long term employment relationships tend to provide workers with some specific capital with quite high returns. On the other hand, general and sector specific skills seem not to be transferable.

4 Conclusions and Further Research

In this paper, we estimate the average returns to experience, firm- and sector-specific tenure for a sample of Italian workers in the private sector. The relative contribution of the above factors is discussed and theoretical considerations are advanced to explain the patterns found in the data.

The estimation method allows to deal with all the two forms of endogeneity, i.e., omitted variables and simultaneity. In particular, the identification strategy

based on displaced workers allows to reduce the upward bias in the estimated coefficients. I use a sample of very young workers (younger than 25 at entry) to study wage growth in early stages of the careers as in this period most of wage increase takes place. I limit my attention to male workers and separate the analysis for blue collars and white collars.

The main findings are as follows. Descriptive evidence suggests that mobility rates in the Italian labour market are reasonably similar to those for other European countries (see Dustmann and Meghir, 2003). Interesting patterns emerge looking at differences between blue and white collars. The average number of jobs held by year of experience indicates that on average workers have about three jobs after 5 years in the labour market, with higher figures for blue collars. Interestingly, the mobility process indicates that around 85% of changers find a job after two years; 60% of white collars stay in unemployment for less than one month. Surprisingly, displaced workers seem to have higher chances to re-enter the labour market, 75% of them make job-to-job transitions. Sector mobility reveals also interesting differences between job changers and displaced workers. In this case, displaced workers are more likely to find a job in the same sector, indicating that some sector-specific skills are not transferable. The descriptive picture of mobility is completed looking at average wage growth of workers by year of experience. Results indicate that stayers have a somewhat flatter wage-experience profile and that initial higher wage growth for movers can be due to higher variance of alternative wages for workers at the beginning of their career. As experience accumulates the gap declines and average wage growth gets almost the same for movers and changers. Matching considerations seem also to play a role. However, the pattern shows interesting differences when comparing blue and white collars. The latter seem to be positively selected and experience some wage gains upon moving to new jobs.

Descriptive results are completed by estimations for average returns to experience, seniority and sector tenure taking into account of heterogeneity and endogeneity. The analysis is carried out separately for blue and white collars. The former exhibit an average return that is increasing for all the specifications adopted. However, considering only previously displaced workers, returns to experience are significantly reduced. This is most true when selection and endogeneity are also taken into account; in this case, after five years of experience, blue collars get a stable return of 1% per year. Wage profiles are definitely steeper for white collars. Interestingly, job changers seem to be positively selected as they have better career prospects in the new firms. For these workers, the control function approach doesn't seem to help a lot. Although returns are reduced compared to OLS estimates, they are not really significant. What clearly emerges is that returns are increasing with years of experience up to four years, and then decline afterwards. This evidence can indicate that their career are more stable and that matching considerations are relatively less important for them. (However this contradicts descriptive evidence.) On the other hand, an important role is

played by sector-tenure. This is particularly true for white collar workers, that have persistently higher returns to sector tenure. Combined with the previous result for experience, these figures indicate that white collars benefit from a learning by doing process and enjoy a great part of their lifetime wage growth while on the job. Finally, returns to tenure are estimated. For blue collars, taking the sample of displaced workers, I find that returns to tenure are negative during the first three years, but then increase constantly to reach 9% during the years 6-9. However, these effects are not statistically significant. Controlling for endogeneity and selection, substantial returns to tenure are found. During the first three years those returns are equal to 5%, and even during the next three years they persist. Results for white collars indicate also important tenure effects. The OLS estimates indicate an average return to tenure of 6% during the first 3 years, those returns then decline to 2% afterwards. Wage growth effect show the same pattern as for blue collars. with a negative return associated with job change and displacement, but with a consistent recover afterwards. Finally, controlling for endogeneity and selection effects quite large and substantial tenure effects emerge. After 9 years at the same firm, wages increase by 30%.

The increase in returns to tenure can be the effect of a reallocation of returns from experience to tenure, since returns to experience decline substantially after controlling for selection and search. The increase in returns to tenure over time seem to be due to the shift between experience and tenure. The increase in the returns to tenure when correcting for selection is consistent with a matching model, where workers with a high individual effect in the return to tenure have stronger incentive to move and match with a better firm if the improvement is such to counteract the returns to tenure.

In conclusion, returns to tenure are quite high when compared with returns to sector tenure and experience. This effect is stronger for white collars, and this seems to be the fundamental source of wage growth. Long term employment relationships tend to provide workers with some specific capital with quite high returns. On the other hand, general and sector specific skills seem not to be transferable.

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