The Spatial Dimension of Internal Labor Markets*

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March 1, 2014

Draft Version

Abstract

Using longitudinal linked employer-employee data for the universe of Portuguese private sector firms, we document the spatial dimension of internal labor markets and show that moving across production sites, especially if these are located in different regions, is part of a worker's career in a multi-establishment organization. We describe the patterns of mobility of workers that have the option to move within and between firms with or without moving across regions. Based on this information we identify the returns to regional migration by comparing the evolution of wages of workers who moved from one region to another with and without changing firms. Our estimates put the regional migration premium at 2%. We also find that the return to regional migration is lower when workers move to the largest Portuguese urban areas.

JEL codes: J61; J62; R23
Keywords: internal labor markets; intra-firm mobility; regional migration

*We thank Nils Braakmann, Ana Rute Cardoso, Alberto Castro, Mónica Costa Dias, Gábor Kátay, Pedro Martins, and participants at various conferences and workshops for very helpful comments and suggestions. The first author acknowledges financial support from Fundação para a Ciência e Tecnologia (grant SFRH/BD/18156/2004). The authors also acknowledge the Ministry of Employment, Department Statistics (GEP), for granting access to the *Quadros de Pessoal* dataset. The usual disclaimer applies.

†CEF.UP - Center for Economics and Finance at University of Porto is funded by Fundação para a Ciência e Tecnologia (project reference: PEst-OE/EGE/UI4105/2014.

1 Introduction

The allocation and re-allocation of workers to jobs inside an organization is an essential component of internal labor markets (ILM), the set of long-term arrangements that govern the employment relationship. The empirical relevance (and resilience) of ILMs is well documented in the literature.[1] Labor economists and researchers in the field of Industrial Relations devoted much attention to the study of ILMs and especially to careers within organizations. However, despite the fact that multi-establishment firms account for a large share of total employment and total output (Bernard and Jensen, 2007, and Cappariello *et al.*, 2012), studies of ILMs remain focused on single-establishment/single location firms (for an early and influential study, see Baker *et al.*, 1994a and 1994b). The spatial dimension of ILMs is thus totally neglected. Bartel (1979) and Hunt (2004) are among the very few studies to analyze within ILM moves that imply an internal migration. However, given their focus on the estimation of returns to migration, they do not analyze within-ILM moves within the same region.[2]

In this article we analyze worker mobility inside multi-establishment organizations thereby allowing for internal transfers of workers within organizations with multiple establishments and possibly multiple locations. In so doing, we are able to distinguish between transfers across establishments of the same company that do and do not imply a change of region (internal migration). Data on the incidence of such movements is direct evidence of the geographic scope of ILMs, firm-wide or location-specific.

Accounting for the spatial dimension of ILMs allows us to disentangle returns to job-switching from returns to regional migration by comparing the evolution of wages of workers that move between establishments of the same firm with and without changing regions. This approach to the estimation of the returns to regional migration is akin

[1] The origin of the Internal Labor Market concept is usually traced back the contribution of John T. Dunlop and Clark Kerr in the 1950s, pushed forward by Doeringer and Piore's (1971) first steps towards integrating the ILM approach with the textbook (neoclassical) model of the labor market. For a review of the studies on ILM, see Wachter and Wright (1990). Groshen and Levine (1998) and Lane *et al.* (2002) document the importance of ILMs in large firms and their response to changing economic conditions in the last 20 years of the 20^{th} century.

[2] Except for these two studies, the migration literature focuses on migration decisions that are typically accompanied by employer changes (Schaeffer, 1985; Shaw, 1991; Krieg and Bohara, 1999).

to Yankow's (2003) comparison of the evolution of earnings of job-switchers that move and do not move across regions. Yankow's approach is, however, vulnerable to biases due to failure to control for employer-specific effects.

Furthermore, we also compare returns to worker mobility inside an ILM (within or across regions) with returns to job-switching (again, within or across regions), thereby estimating the returns to job-switching properly accounting for spatial effects.

This article is organized as follows. Section 2 describes the data. Section 3 summarizes the results on the determinants of worker's propensity to move within or across organizations and/or within or between regions. Section 4 describes our approach to the estimation of the returns to worker mobility and presents the results. Section 5 concludes.

2 The Data

2.1 Personnel Records

In this article, we use matched employer-employee data from *Personnel Records* (*Quadros de Pessoal*, henceforth *QP*), an annual mandatory employment survey collected by the Portuguese Ministry of Employment that all firms with wage earners are legally obliged to fill in.

QP exist since 1985 but some data used in this article is not available before 1999. For that reason, our analysis covers the period between 1999 and 2005. The 1999 wave of the data are used to identify for 2000 worker moves within and across firms and regions, workers being subsequently tracked until 2005. All subsequent moves are identified through comparison of the triplet worker-firm-establishment in two consecutive years.[3]

Firms, establishments and workers entering the database are assigned a unique identification number that makes it possible to trace them across all annual waves of data. For the same reason, workers can be matched with their employers both at the firm and the establishment level. Movements across firms and across establishments within

[3]For the 2001 wave of *QP*, worker-level data are not available. This omission causes identification issues that we acknowledge below.

or between firms are thus identifiable from the data.

Data include establishment-specific details (employment, location, economic activity), information on the firm with which the establishment is affiliated (location, economic activity, number of establishments, employment, sales, ownership, legal framework), and workforce characteristics (gender, age, education, occupation, tenure, earnings, hours of work).

2.2 Construction of the Data Set

The data set used in this article was obtained from the raw QP-data imposing a number of restrictions. First, the sample was restricted to workers aged 15 to 65 that are also classified as wage-earners (*i.e.*, employers are excluded). Individual observations with zero wage as well as those with inconsistent information across waves on gender, age or tenure were deleted. Multiple job-holder workers (less than 1 percent of the total) were also excluded.

Considering that we are interested in analysing mobility patterns of workers that have the option of moving within and between firms, within-firm movements implying that the firm has more than one establishment, we further restricted the sample to workers that in 1999 were employed by multi-establishment firms.[4] All moves caused by the shutdown of the establishment where the worker previously worked were also deleted as in this case workers do not have the option of not moving[5]

Workers in the final data set were subsequently classified in one of five categories defined as follows:

1. Same employer, same region (SESR): the worker moved across establishments within the same firm and within the same region;

2. Same employer, different region (SEDR): the worker moved across establishments within the same firm but to a different region;

[4]Multi-establishment firms are approximately 10 percent of all Portuguese firms and they account for about 1/3 of total employment. On average, multi-establishment firms have 4 establishments and 70 workers.

[5]We identify an establishment shutdown in one year whenever information for the establishment is absent for that year and for all subsequent years, i.e., if the establishment is not present in any of the subsequent waves of the data until 2009. Around one third of all within firm transfers are due to an establishment shutdown.

3. Different employer, same region (DESR): the worker switched jobs (*i.e.*, moved between firms) within the same region;

4. Different employer, different region (DEDR): the worker swtiched jobs (*i.e.*, moved between firms) and moved to a different region;

5. Base category (NM): the worker did not move, *i.e.*, he/she remained in the same establishment of the same firm, forcefully in the same region.

Following their allocation to one of these five groups, workers are traced over until 2005. In the event that they experience a secondary move over this period, they are reallocated to the corresponding group and traced in that group until the end of the observation period. The same procedure is used in the rare event of more than two moves by the same worker between 2000 and 2005.[6]

To identify internal migrations we adopted the administrative division of the Portuguese territory in 'distritos', 18 in the Mainland, plus the islands of Madeira and Azores. In our data we only have information on the place of work, not on the place of residence. For that reason, the identification of region changes on the basis of movements from one 'distrito' to another may be misleading as they may not correspond to a change of residence, *i.e.* to a true migration. To minimize this possibility we define a change of region as a movement from one 'distrito' to another if the 'distrito' of destination does not share borders with the 'distrito' of origin.[7] According to this definition 10 percent of all within-firm movements and 7 percent of all job-switching movements imply a change of region (the corresponding figures, if the border-restriction is not imposed, are 19 and 16 percent, respectively).

Our final sample includes 1.5 million observations, 889 thousand of which did not move across establishments (or regions) - see Table 1. 56.7% of all workers that experience some type of move, moved within the same firm without changing regions. Region

[6] As we mentioned in the previous subsection, data on workers are not available for the year 2001. For that reason, worker status in that year cannot be determined. Hence, in 2002 we allocated workers to the groups mentioned above by comparing their situation in the years 2000 and 2002. Any move thus observed is arbitrarily attributed to the year 2002.

[7] We do note, however, that we estimated all the models reported in sections 3 and 4 with and without imposing the 'no commom border' restriction, and the results did not change qualitatively.

changes, with or without changing employers are the least frequent although they still account for 9.0 percent of all moves.

	Movers					Stayers
	Total	SESR	SEDR	DESR	DECR	NM
Year of the move	286874	162761	17835	98343	7935	324489
1 year after	182456	93445	6320	79064	3627	182796
2 years after	105123	49269	2933	51064	1857	138405
3 years after	60458	26949	1598	30854	1057	124794
4 years after	21736	8543	577	12337	279	118789
Total	656647	340967	29263	271662	14755	889273

Table 1: Number of observations by type of move (2000-2005)

2.3 Descriptive Statistics

As one could expect, workers making some kind of move between establishments and/or between regions differ in a number of characteristics from stayers, our baseline category. But the group of movers is also heterogeneous. Stayers are younger, low-tenured and more likely than movers to be assigned to the bottom-half of the job-title rank (see Appendix A). More than half of all stayers work in three groups of industries: manufacturing (23.0 percent), wholesale and retail trade (21.5 percent), and transport, storage and communication (14.9 percent).

Workers switching employers are younger and have lower tenure than within-firm movers. Individuals at the the top and bottom ends of the hierarchy of jobs are especially likely to move across jobs with or without changing regions. Workers with the highest and the lowest schooling attainment are the most likely to move within the same firm. There is a clear link between education achievement and mobility type. The least educated workers are especially likely not to move or to move within the firm although in the latter case more so when a region change is involved. It should be noted however that the mobility pattern of workers with low levels of education is dominated by one single industry - construction - that employs about 70% of all workers in this

group. Our sample of employer changers also displays a high proportion of workers with more than 12 years of schooling. College graduates are the most mobile group and especially likely to move across regions as they switch jobs. Mobility in this group is largely shaped by the behavior of workers employed in the financial sector that are most likely to move within the firm with or without changing regions. Foreign workers are more mobile than natives.

The incidence of different types of mobility varies across industries. Internal moves prevail in construction, in hotels and restaurants and in financial activities, while employer changes dominate also in construction and in real estate, renting and business activities.

Internal labor markets are more likely to be present in large firms, so it is not surprising that same employer transfers prevail in these firms. We also see that the group of individuals that changes region within the same organization work for firms that are less regionally concentrated and thus a face a more limited range of choices in the region where they were previously working.

Table 2 displays information on the real hourly earnings (in logs) broken down by the five mobility groups defined above.[8]

The first result to notice on Table 2 is that worker switching jobs are the ones that earn the lowest starting wages and also the ones to gain more from the move. Movements between establishments of the same firm do not result in wage variations that are smaller than what is experienced by workers in all other mobility groups. Unconditional returns to mobility within an organization with change of region are considerably larger than the returns to other within-firm movements (*i.e.* within the same region).

Internal transfers, *i.e.*, transfers to across establishments of the same firm, may be directed towards pre-existing or newly-created establishments. In our sample, about one fourth of all same employer transfers were made to newly-opened establishments.[9]

[8]Hourly earnings are defined as the ratio between total regular and irregular earnings (*i.e.*, including regular and irregular pay) and the number of normal hours of work. Wages were converted to constant 2005 Euros, using the Consumer Price Index (CPI).

[9]We identify an opening whenever information for that establishment is reported to QP for the first time in the

	SESR	SEDR	DESR	DECR	NM
Year of the move	1.92	2.05	1.73	1.77	1.80
1 year after	1.93	2.15	1.93	1.91	1.87
2 years after	1.93	2.22	1.98	2.01	1.87
3 years after	1.95	2.23	1.97	2.05	1.88
4 years after	1.91	2.20	2.11	2.08	1.86

Table 2: Evolution of real hourly earnings (in logs), by type of mobility: 2000-2005

Approximately 20% of all same employer transfers were associated with a promotion event in the year of the transfer.[10] Approximately one fourth of all internal transfers are return moves. The urban areas of Lisbon and Porto are the destination of about 50% of all moves implying a change of region (see Table 3).

	Same Employer Transfers			Employer Changes		
Year	Porto	Lisbon	Total	Porto	Lisbon	Total
2000	20%	28%	48%	19%	31%	50%
2002	19%	34%	53%	18%	27%	45%
2003	20%	36%	56%	24%	27%	51%
2004	20%	29%	49%	17%	33%	50%
2005	25%	29%	54%	22%	29%	51%

Table 3: Proportion of all Region changes headed towards Lisbon and Porto : 2000-2005

3 Intra-firm and Inter-firm Mobility

To set the profile of workers experiencing different types of mobility and estimate the corresponding probabilities,we adopt a multinomial logit specifications that is appropriate in the case of discrete response variables with more than two outcomes.

In our model y_{ij} denotes the type of move made by individual i. Following our categorization of mobility, five alternatives (j) are admissible: 1) same employer same

corresponding spell,*i.e.*, if the establishment is not present in any of the preceding waves of the data (starting in 1985).

[10]Information on the date of each worker's last promotion is reported by the employer together with all other worker-level data. There are no specific guidelines or a definition of promotion. Therefore the identification of a promotion event is left to the employer criteria.

region (SESR); 2) same employer, different region (SEDR); 3) different employer, same region (DESR); 4) different employer, different region (DEDR); and 5) no move (NM), the base category.[11]

As independent variables - vector $\mathbf{X}$ - we included a number of variables that, following previous work by Bartel (1979), Hunt (2004), and Turban *et al.* (1992) are believed to influence both intra-firm and inter-firm mobility. $\mathbf{X}$ includes a set of worker characteristics (age, gender and education), a set of firm characteristics (industry, size and the concentration of establishments of the same parent firm in the region of origin), and a set of match characteristics (tenure, job title, hourly wage and an indicator of promotion on the previous three years). The full list of variables included in $\mathbf{X}$ and the corresponding definitions are presented in Appendix B.

Assuming extreme value distribution and i.i.d errors, the probability that the outcome for individual i is alternative j, conditional on a vector of variables $\mathbf{X}$ is:

$$\mathbf{P}(y_i = j|\mathbf{X}) = \frac{\exp(\mathbf{X}_i'\beta_j)}{\sum_{l=1}^{5}\exp(\mathbf{X}_i'\beta_l)}, \quad j = 1, ..., 5$$

In Table 4 we report the results for the MNL regression.

Regardless of the type of move considered, women move less than men and non-native workers move more than natives. Older, more experienced, workers are more likely to move within the organization, within or between regions, than to remain in the same establishment of the same firm, although they are less likely to leave for an outside

[11] The hypothesis of equal regressors for pairs of mobility types was tested by means of a Wald test and it was rejected in all cases. We were especially interested in testing the poolability of the two types (with and without changing employers) of within-region moves (DESR and SESR), and the two types (with and without changing firms) of between-region moves (DEDR and SEDR). Considering the results of the tests, we analyzed the five initial types of mobility separately). We also tested the validity of the Independence of Irrelevant Alternatives (IIA) assumption, one strong assumption of MNL. We compared, by means of the Hausman test, the full model with the restricted models obtained by successive elimination of one type of mobility. The IIA assumption was not rejected only in the case of DESR type of mobility. The Small-Hsiao test also leads to the rejection of the IIA assumption. We do acknowledge these results although we also note that these tests are known to provide little guidance regarding the validity of the IIA assumption (Long and Freese, 2001; Cheng and Long, 2007).

	SESR		SEDR		DESR		DEDR	
Independent Variables	Coef.	t-ratio	Coef.	t-ratio	Coef.	t-ratio	Coef.	t-ratio
Female	-0.0786***	(-9.74)	-0.2744***	(-10.43)	-0.1292***	(-11.66)	-0.2231***	(-5.52)
Age	0.0142***	(4.68)	0.0586***	(6.34)	-0.0444***	(-12.31)	0.0092	(0.67)
Age square	-0.0269***	(-7.39)	-0.0884***	(-7.97)	-0.0343***	(7.68)	-0.0302*	(-1.72)
Nationality	0.3309***	(8.63)	0.3626***	(4.15)	0.4099***	(9.56)	0.1380	(0.88)
Educ4	0.0223	(1.30)	0.2960***	(5.75)	-0.1337***	(-5.46)	-0.3516***	(-4.17)
Educ9	-0.1126***	(-7.95)	-0.1213***	(-2.73)	-0.1529***	(-7.53)	-0.4744***	(-6.70)
Educ12	-0.0435***	(-3.34)	-0.1986***	(-4.59)	-0.0719***	(-3.82)	-0.3948***	(-6.14)
Tenure36	0.2714***	(23.41)	0.5865***	(19.06)	1.6512***	(105.46)	2.5360***	(44.72)
Tenure96	0.0501***	(5.19)	0.1743***	(6.37)	0.3479***	(24.31)	0.9803***	(17.53)
Prom [-3,0]	-0.0055	(-0.80)	-0.1544***	(-7.92)	-0.9711***	(-78.12)	-1.2659***	(-29.41)
$\ln w$	-0.2179***	(-21.54)	-0.0031***	(-3.11)	-0.1565***	(-11.41)	-0.2624***	(-5.17)
Size	0.1862***	(71.14)	0.0951***	(9.24)	-0.0180***	(-5.33)	-0.1218***	(-10.74)
Estab. Concentration	0.6158***	(44.45)	-2.8241***	(-53.31)	-0.2522***	(-12.76)	-1.2733***	(-18.37)
Constant	-3.2094***	(-46.04)	-4.6011***	(-21.19)	-0.9159***	(-11.17)	-3.8059***	(-12.82)
Log pseudo-Likelihood	-630488.18							
Prob $> \chi^2$	0.0000							
Pseudo R^2	0.1002							
N	1164938							

Notes: NC category is the base outcome;

All regressors are lagged one year. Specification also includes a set of time dummies, industry dummies and controls for hierarchical levels;

For the definition of all the variables see Appendix B.

Worker-cluster robust t statistics in parentheses;

***, **, * significant at 1, 5, and 10%, respectively.

Table 4: MNL regression: 1999-2005

employment opportunity. The former result indicates that in large multi-establishment firms careers are organized firm-wide and more experienced workers do move across establishments even for distant locations.

Workers with college education are the more likely to move to all four destinations considered. For internal moves, this result is consistent with Hunt (2004) who finds that same employer transfers are a low-cost migration avenue for highly-skilled workers. For cross-regional moves, the result is consistent with the fact that the job market for highly-skilled workers is national not local, (Bartel, 1979). It should be noticed, however, that workers with 4 years of education also have a high probability of moving across regions within the firm. We do note the result although we also note that it is mostly driven by mobility patterns in two low-skill sectors - construction and hotels and restaurants.[12]

High wages reduce the probability of job-switching, which is equivalent to saying that good matches are more likely to survive. A similar result is obtained for past promotions that may also be taken as an indicator of a good match - workers promoted less than three years before the moment of observation are less likely to leave (voluntarily or not) the firm. Higher wages and past promotions also reduce the probability of being transferred across establishments of the firm. This is an indication that within the firm internal labor market, good matches are synonymous to good employee-establishment matches, *i.e.*, they are establishment-specific. These results also imply that in large multi-establishment companies lower-value matches are offered an alternative to termination - an internal transfer - that is, in fact, an opportunity to increase the value of the match. This is an indication that, in these work settings, internal labor markets are set firm-wide, the allocation of workers to jobs being achieved by means of movements between establishments that may or may not imply a regional migration. This result is further reinforced by the fact that 20% of all same employer transfers are accompanied by a promotion. Bartel (1979) also found that internal transfers acted as promotions.

Low-tenured workers are more likely to move. For external moves, the result has a standard human capital interpretation as workers with lower tenure invested less in

[12]Hunt (2004) also finds a polarization of same employer migration in low and high-skill jobs, such as cashiers (for women) and architects and engineers (for men).

firm-specific training. For moves within the firm, the result is consistent with two interpretations. One interpretation is that the matching process occurs inside the firm by means of a reallocation process that results in recently-hired workers occupying temporary entry positions until sufficient information becomes available to choose their final position, at which point they are transferred internally. An alternative interpretation is that workers are hired for specific positions but they are initially allocated to other where they are screened and trained for the position they were hired to. The data we have do not allow us to tell which interpretation dominates.

Larger firms offer more opportunities to move internally. Therefore, as expected, the results indicate that workers employed by larger companies are more likely to move inside the firm and less likely to leave for outside employment opportunities. For the same reason, when the multi-establishment firm is regionally concentrated, internal moves with regional transfers become less likely.

4 Returns to Mobility

4.1 Empirical Strategy

Our purpose is to estimate worker's returns to mobility. Therefore we estimate a standard wage equation augmented to include indicator variables that control for the type of mobility and time elapsed since the worker moved.

We acknowledge that mobility decisions raise selectivity problems that, if ignored, lead to biased OLS estimates (Borjas, 1987). For same employer movers, selection may occur for two reasons. First, employer choose which employee is offered the opportunity to move to a different establishment. However, the transfer will not be observed except if the worker accepts the opportunity he/she is offered. Both decisions being determined by the expected gains from moving that in the present context are wage/productivity gains arising of the expected increase of the value of the match. *I.e.*, internal transfers are the result of administrative selection and self-selection. External transfers are also determined by similar selection mechanisms, administrative selection and self-selection dominating depending on whether the worker moves voluntarily or not.

With endogenous regressors an instrumental variable approach would be in order. However, there are no obvious choice of instruments for the problem that we are confronting. For that reason, we use a fixed-effects approach that allows to account for unobserved (permanent) individual heterogeneity that may influence the decision to move. We are assuming that unobserved transitory individual-specific shocks are uncorrelated with the decision to move.

We start by estimating a wage equation with controls for worker fixed-effects and, subsequently, extend it to account simultaneously for worker and firm fixed-effects (Guimarães and Portugal, 2010).[13] With worker fixed-effects only, our model is written as:

$$\ln w_{it} = \alpha_i + \beta \mathbf{X}_{it} + \sum_{k=0}^{4} \delta_k SESR_{it}^k + \sum_{k=0}^{4} \lambda_k SEDR_{it}^k + \sum_{k=0}^{4} \theta_k DESR_{it}^k + \sum_{k=0}^{4} \tau_k DEDR_{it}^k + \gamma_t + \varepsilon_{it}$$

Adding firm-fixed effects, the model becomes:

$$\ln w_{ijt} = \alpha_i + \varphi_j + \beta \mathbf{X}_{it} + \sum_{k=0}^{4} \delta_k SESR_{it}^k + \sum_{k=0}^{4} \lambda_k SEDR_{it}^k + \sum_{k=0}^{4} \theta_k DESR_{it}^k + \sum_{k=0}^{4} \tau_k DEDR_{it}^k + \gamma_t + \varepsilon_{ijt}$$

$\ln w_{ijt}$ is the logarithm of real hourly earnings for individual i and firm j at period t. α_i is the individual fixed-effect, φ_j is the firm fixed-effect and $\mathbf{X}_i$ is a vector of individual and firm characteristics.

$SESR_{it}^k$, $SEDR_{it}^k$, $DESR_{it}^k$, and $DEDR_{it}^k$ are dummy variables that take on the value one if at time t worker $i$is k years after being transferred to (a) another establishment of the same firm in the same region, (b) another establishment of the same firm located in a different region, (c) changing employer within the same region, or (d) changing employer and region, respectively.

The δ_k, λ_k, θ_k, and τ_k parameters measure the difference in individual earnings k years after the corresponding type of move and the earnings of similar workers in the reference category (workers that did not change employer nor establishment).

[13] Alternatively, the model was estimated with worker and establishment fixed-effects. Results are reported in the Appendix C.

γ_t is a set of time dummies that control for year-specific effects and ε_{it} and ε_{ijt} are the disturbance term which are assumed to have zero mean and constant variance.

For our purpose, the δ_k, λ_k, θ_k, and τ_k parameters are the parameters of interest. Their estimates capture the wage premiums for the four different types of mobility considered not only in the year of the move but also in the subsequent four years, thereby allowing us to isolate immediate and long-term gains to mobility.

4.2 Results

4.2.1 Same Employer Transfers and Migration Premiums

As a benchmark, in the first column of Table 5 we report the OLS estimates of the returns to mobility. The second and third columns show, respectively, the results for the worker fixed-effects and the worker and firm fixed-effects specification.

Looking at the individual fixed-effects estimation we see that although the estimated returns to mobility are always statistically significant, the FE wage premium for migration is considerably lower than the OLS.

With worker fixed-effects we find positive and statistically significant wage premiums, albeit smaller than the OLS estimates. For local moves within firms (SESR), premiums range from 1.6% in the year of the change to 2.8% in the third year after the move. For same employer migrants (SEDR) we observe a wage premium of 3.9% in the year of the change increasing to 4.4% three years after the change. When we observe a region change, the premium includes, not only the progression in the internal labor market but also the compensating differential for migration. The difference between the premiums to same employer moves within the same region and across regions, our estimation of the wage premium for regional migration (when employees have to incur in the additional costs of geographic mobility), is approximatelly 2 percent. However, we should note that this estimate should be read as a lower bound on the returns to regional migration. Moving between establishments of the same company also implies the loss of establishment-specific human capital accumulated on the job. If that is the case, our estimate should be seen as a lower bound for the actual return to migration.

	OLS		Worker FE		Worker and Firm FE	
Variables	Coef.	t-ratio	Coef.	t-ratio	Coef.	t-ratio
$SESR_0$	-0.0047***	(-3.17)	0.0163***	(17.61)	0.0124***	(13.27)
$SESR_1$	0.0021	(1.26)	0.0245***	(21.85)	0.0206***	(18.57)
$SESR_2$	0.0002	(0.08)	0.0247***	(15.34)	0.0284***	(13.33)
$SESR_3$	0.0047*	(1.64)	0.0274***	(15.31)	0.0242***	(13.94)
$SESR_4$	-0.0230***	(-4.78)	0.0181***	(6.38)	0.0144***	(5.27)
$SEDR_0$	0.1095***	(24.40)	0.0387***	(16.35)	0.0335***	(14.47)
$SEDR_1$	0.1390***	(21.11)	0.0416***	(12.11)	0.0362***	(10.91)
$SEDR_2$	0.1538***	(16.20)	0.0417***	(8.35)	0.0364***	(7.89)
$SEDR_3$	0.1476***	(11.33)	0.0426***	(5.19)	0.0387***	(4.77)
$SEDR_4$	0.1579***	(7.56)	0.0434***	(4.37)	0.0391***	(4.11)
$DESR_0$	0.0553***	(29.08)	0.0120***	(9.37)	-0.0055***	(-3.29)
$DESR_1$	0.0589***	(32.01)	0.0226***	(17.28)	0.0017	(0.98)
$DESR_2$	0.0616***	(28.89)	0.0310***	(20.43)	0.0084***	(4.41)
$DESR_3$	0.0577***	(21.40)	0.0314***	(17.34)	0.0101***	(4.79)
$DESR_4$	0.0502***	(13.31)	0.0333***	(13.14)	0.0128***	(4.75)
$DEDR_0$	0.0640***	(10.52)	-0.0113***	(-3.06)	-0.0117	(-2.55)
$DEDR_1$	0.0980***	(11.48)	0.0145***	(3.06)	0.0600	(1.09)
$DEDR_2$	0.1437***	(11.72)	0.0369***	(5.93)	0.0241***	(3.55)
$DEDR_3$	0.1502***	(9.62)	0.0391**	(2.43)	0.0380	(0.47)
$DEDR_4$	0.1674***	(5.52)	0.0351**	(2.47)	0.0254*	(1.83)
Constant	1.1801***	(131.57)				
N	1545920		1545920		1545920	

Notes: Dependent variable: Log of average real hourly earnings;

Controls for gender, age, education, tenure firm size, as well as time and industry dummies were included in all specifications;

For the definition of all variables, see Appendix B;

Worker-cluster robust t statistics in parentheses for the OLS model;

***, **, * significant at 1, 5, and 10%, respectively.

Table 5: Regressions for wages, 2000-2005

Our results also indicate that returns to migration are not limited to the migration year (Schaeffer, 1985 and Yankow, 2003), even if migration occurs within continuing employment relationships.

Following Yankow (2003), we may also obtain an estimate of the returns to regional migration as the difference between the estimated wage returns for workers changing employers locally and those that migrate a different region. In our case, the corresponding estimate varies from negative to 0.5 percent. We do note, however, that these results do not account for the reason why employers change jobs (voluntarily or due to being laid-off) and do not properly control for firm-effects.

As firm (or establishment) specific effects may be relevant, we also estimated the wage equation using a two-dimensional fixed effects approach. In Table 5 we reported results for the model with individual and firm fixed-effects.[14]

With the two FE most of the conclusions previously obtained with the individual specific effects remain valid. Although we observe a slight decrease in the premiums, especially for those individuals that changed employer, the migration premium measured by the differential between local and non-local same-employer transfers continues to be around 2 p.p. The premium to switching jobs is negative and that indicates that, in our sample of employees in large multi-establishment firms, termination of employment relationships are mostly involuntary (*i.e.*, dismissals).

4.2.2 Same Employer Transfers to Urban vs Non-urban Areas

In this subsection we focus on transfers within organizations accounting for differences in destination areas. Given the fact that the spatial concentration of establishments and workers offer productivity (and wage) advantages and also offer amenities and disamenities that may attract compensating wage differentials, we would like to estimate returns to within-firm regional moves when these moves are headed to the two major metropolitan areas (Lisbon and Porto) or to other areas. As we mentioned above (see Table 3), approximately 50 percent of all internal transfers are made towards these

[14]We estimated the same model with individual and establishment-specific effects. Results, reported in Appendix B, do not qualitatively differ fom the worker-firm fixed-effects estimation.

two urban areas. Hence, we re-estimated the same wage equation as in the previous subsection but distinguishing transfers internal to the firm directed towards Lisbon and Porto from all other internal transfers.

The results in Table 6 indicate that, workers outside the two urban areas that move between establishments without changing regions receive a wage premium that is slightly higher than that received by workers in Lisbon and Porto that move within the same firm. A similar result is obtained for movements between regions: workers migrating to non-urban areas get a larger wage premium relatively to workers that migrate to the districts of Lisbon and Porto. The results for the two fixed effects estimation indicate that migrations to Lisbon and Porto are associated with premiums that range from 1.2% in the year of the change to 3.0% two years after the change, whereas for workers that move to other less central areas, wage premiums are significantly higher and range from 6.4% in the year of the change to 8.4% four years after the change.

	Worker FE		Worker and Firm FE	
Variables	Coef.	t-ratio	Coef.	t-ratio
PL_SESR_0	0.0130***	(11.67)	0.0083***	(7.42)
PL_SESR_1	0.0208***	(15.01)	0.0162***	(11.81)
PL_SESR_2	0.0210***	(11.24)	0.0164***	(9.42)
PL_SESR_3	0.0295***	(12.91)	0.0258***	(11.68)
PL_SESR_4	0.0176**	(2.06)	0.0132	(0.89)
PL_SEDR_0	0.0174***	(5.96)	0.0121***	(4.27)
PL_SEDR_1	0.0255***	(5.75)	0.0209***	(4.90)
PL_SEDR_2	0.0258*	(1.83)	0.0291	(1.47)
PL_SEDR_3	0.0291	(0.84)	0.0262	(0.51)
PL_SEDR_4	0.0215	(0.24)	0.0203	(0.02)
Ot_SESR_0	0.0221***	(16.33)	0.0193***	(14.39)
Ot_SESR_1	0.0302***	(18.88)	0.0213***	(17.49)
Ot_SESR_2	0.0349***	(12.43)	0.0223***	(11.49)
Ot_SESR_3	0.0361***	(10.35)	0.0237***	(9.74)
Ot_SESR_4	0.0319***	(7.84)	0.0293***	(7.50)
Ot_SEDR_0	0.0638***	(20.81)	0.0617***	(19.75)
Ot_SEDR_1	0.0649***	(12.94)	0.0684***	(12.11)
Ot_SEDR_2	0.0756***	(11.02)	0.0709***	(10.77)
Ot_SECR_3	0.0853***	(7.23)	0.0714***	(6.99)
Ot_SEDR_4	0.0861***	(6.52)	0.0808***	(6.40)
$DESR_0$	0.0118***	(9.20)	-0.0063***	(-3.73)
$DESR_1$	0.0224***	(17.13)	0.0010	(0.55)
$DESR_2$	0.0308***	(20.41)	0.0076***	(4.00)
$DESR_3$	0.0312***	(17.25)	0.0094***	(4.42)
$DESR_4$	0.0331***	(13.05)	0.0120***	(4.44)
$DEDR_0$	-0.0113***	(-3.06)	-0.0120	(-2.63)
$DEDR_1$	0.0144***	(3.03)	0.0055	(1.01)
$DEDR_2$	0.0368***	(5.92)	0.0237***	(3.49)
$DEDR_3$	0.0191**	(2.43)	0.0034	(0.42)
$DEDR_4$	0.0350**	(2.46)	0.0249*	(1.79)
N	1545920		1545920	

Notes:

Dep. variable: Log of average real hourly earnings (reg+irreg);

Controls for gender, age, education, tenure firm size, as well as time and industry dummies were included in all specifications;

For the definition of all variables, see Appendix B;

educ12 and size also included as controls.

***,**,* significant at 1, 5, and 10%, respectively.

Table 6: Regressions for wages distinguishing moves to Lisbon or Porto, 2000-2005

5 Conclusion

In this article we recognize the spatial dimension of internal labor markets and analyze workers' movements between production sites of the same firm. Our results confirm that internal labor markets are set at the firm level: movements between establishments are part of the worker's career inside the firm. These movements are either local and national. In the latter case, a geographic migration is implied.

Same employer movers are mainly low tenured men that were not promoted nor received relative wage increases in the preceding years. For these workers, internal transfers are a form of investment in their own career inside the firm - approximately 20% of all same employer transfers are contemporaneous with a promotion event. For skilled workers, same employer regional transfers are a low-cost avenue for geographic migration.

Comparing wage premiums for the group of same employer transfers across regions with the returns to same employer local moves, we find that the wage premium to regional migration is 2% and that it does not fade away at least over a 4-year period. Finally, our results also indicate that migrants to the largest Portuguese urban areas receive a wage premium that is 5 p. p. higher than the premium received by workers who migrate to other areas.

Appendix A

Descriptive Statistics

Variable		SESR	SEDR	DESR	DEDR	NM	All
Age (in years)		40.3	40.6	36.1	35.9	41.4	40.8
Gender (proportion of female)		39.2%	23.1%	41.8%	33.7%	41.2%	40.2%
Tenure (in months)		148.1	141.2	48.6	25.2	170.6	154.2
Education	4 or less years of schooling completed	25.8%	32.8%	20.8%	21.4%	28.5%	26.3%
	6 or 9 years of schooling completed	35.8%	33.5%	37.7%	35.7%	39.0%	38.4%
	12 years of schooling completed	24.7%	20.1%	25.4%	22.3%	21.8%	23.0%
	More than 12 years of schooling	12.8%	12.7%	14.3%	18.1%	10.2%	11.6%
Job Titles	Top executives	7.1%	7.7%	8.6%	10.6%	6.4%	7.2%
	Intermediary executives	7.4%	7.8%	5.1%	5.5%	5.6%	6.0%
	Supervisors, team leaders, foremen	8.3%	15.9%	3.9%	5.6%	6.4%	6.6%
	High-skilled, skilled professionals	53.5%	55.1%	47.1%	46.5%	53.3%	53.4%
	Semi-skilled, non-skilled professionals	19.6%	10.9%	26.4%	23.0%	24.7%	22.9%
	Apprentices, interns, trainees	1.3%	0.7%	4.7%	2.9%	1.3%	1.5%
Foreign workers		1.3%	1.7%	1.9%	2.0%	0.7%	0.9%
Industry	Agriculture and Fishing	0.5%	0.3%	1.0%	3.0%	1.0%	0.9%
	Mining and Quarrying	0.3%	0.3%	0.4%	0.4%	1.0%	0.7%
	Manufacturing	11.7%	7.3%	0.4%	12.3%	27.8%	23.0%
	Electricity, Gas and Water Supply	2.6%	1.0%	0.5%	1.5%	1.4%	2.4%
	Construction	11.9%	41%	6.2%	16.0%	3.9%	5.9%
	Wholesale and Retail Trade	20.1%	18.9%	24.9%	19.8%	21.8%	21.5%
	Hotels and Restaurants	6.1%	1.5%	6.0%	4.4%	3.2%	3.9%
	Transport, Storage and Communication	14.9%	10.9%	10.0%	7.1%	15.1%	14.9%
	Financial Activities	17.1%	7.7%	6.2%	3.4%	8.6%	10.0%
	Real Estate and Business Activities	6.3%	6.3%	22.4%	27.4%	5.9%	7.7%
	Public Adm., Social and Personal Services	0.1%	0.1%	0.3%	0.2%	0.3%	0.3%
	Education	1.2%	1.0%	1.2%	0.7%	1.4%	1.3%
	Health and Social Work	4.4%	1.2%	2.1%	1.7%	5.2%	4.5%
	Other Social and Personal Services	2.8%	2.4%	3.5%	2.0%	3.3%	3.2%
Firm size (log number of workers)		6.47	6.81	5.96	5.84	5.99	6.08
Concentration of estab. (before the move)		46.5%	23.3%	47.0%	43.5%	49.0%	48.8%

Appendix B

Variables Definition

Variable	**Description**
Tenure36	Tenure less than 36 months
Tenure96	Tenure between 36 and 96 months
Age	Worker's age (in years)
Age squared	Square of worker's age (divided by 100)
Female	Gender dummy equal 1 for female
Educ4	Dummy equal 1 for 4 or less years of schooling completed
Educ9	Dummy equal 1 for 6 or 9 years of schooling completed
Educ12	Dummy equal 1 for 12 years of schooling completed
Nationality	Dummy equal 1 for foreign workers
Promotion [-3,0]	Dummy equal 1 if the worker was promoted in the previous 3 years
Tenure months	Tenure in months
Tenure months squared	Squared tenure in months (divided by 100)
$\ln w$	Real hourly wage (in logs)
Size	Firm size (log number of workers)
Estab.Concentration	Concentration of establishments of the same parent firm in the region of origin
SESR_k	Dummy equal 1 k years after changing estab. in the same region
SEDR_k	Dummy equal 1 k years after changing estab. with region change
DEDR_k	Dummy equal 1 k years after changing employer in the same region
DEDR_k	Dummy equal 1 k years after changing employer with region change
PL_SESR_k	Dummy equal 1 k years after changing estab. in the same region (to Lisbon or Porto)
PL_SEDR_k	Dummy equal 1 k years after changing estab. and region (to Lisbon or Porto)
Ot_SESR_k	Dummy equal 1 k years after changing estab. in the same region (to other regions)
Ot_SEDR_k	Dummy equal 1 k years after changing estab. and region (to other regions)

Appendix C

Wage Regression - Worker and Establishment Fixed-effects (2000-2005)

	Worker and Establishment FE	
Variables	Coef.	t-ratio
$SESR_0$	0.0088***	(6.47)
$SESR_1$	0.0151***	(10.03)
$SESR_2$	0.0172***	(9.96)
$SESR_3$	0.0234***	(11.60)
$SESR_4$	0.0154***	(5.36)
$SEDR_0$	0.0188***	(6.69)
$SEDR_1$	0.0204***	(5.57)
$SEDR_2$	0.0232***	(4.86)
$SEDR_3$	0.0254**	(2.53)
$SEDR_4$	0.0286***	(3.05)
$DESR_0$	-0.0042**	(-2.05)
$DESR_1$	0.0053**	(2.52)
$DESR_2$	0.0132***	(5.96)
$DESR_3$	0.0175***	(7.32)
$DESR_4$	0.0213***	(7.34)
$DECR_0$	-0.0170***	(-3.65)
$DECR_1$	0.0002	(0.03)
$DECR_2$	0.0192***	(2.97)
$DECR_3$	0.0009	(0.11)
$DECR_4$	0.0235*	(1.74)
N	1545920	

Notes:

Dependent variable: Log of average real hourly earnings;

Controls for gender, age, education, tenure firm size,

as well as time and industry dummies were included in all

specifications;

For the definition of all variables, see Appendix B;

***,**,* significant at 1, 5, and 10%, respectively.

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