

Different Endowment or Remuneration? Exploring wage differentials in Switzerland

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Abstract

This paper analyses wage differentials among regions Switzerland. We decompose the regional wage differentials in two components applying a method proposed by Yun (2005) in an extension of the Blinder (1973) and Oaxaca (1973) methodology which offers a solution to the identification problem of detailed wage differential decomposition. The first component captures the wage differential due to differences in the characteristics of workers (regional endowment), and the second explains the differentials due to different returns on these characteristics (regional remuneration). The results show that with respect to the richest Swiss region, Zurich, lower wages in the other regions are to a large extent (45% - 70%) due to different endowment, and thus to long run location decisions of firms and households leading to different regional economies. In other words, less than half of the wage differential is in general due to different remuneration of identical characteristics. Remuneration differences among regions vary with experience, schooling and part time work, while endowment depends mainly on economic structure, firm size and hierarchical position (skills).

JEL-Classification: J31, J32

Keywords: wage decompositions, regional wage differentials,

1. Introduction

This article analyses observed average wage differentials among Swiss regions. This is a matter of great interest that has been analyzed for several countries such as the USA (Gerking and Weirick 1983), Spain (Garcia and Molina 2002), Portugal (Vieira et al. 2005) and Switzerland (Rochira and Rosas 2005).

The special interest in the Swiss case arises from its geographical position, its small scale, and its federalist structure. Situated in the center of Europe without being member of the EU implies that wages can be greatly influenced by trans-border labor markets which are of different relevance for the various regions. The small scale of the country and the ensuing short distances between the regional labor markets (around 60 minutes by car or train) should provoke an important mobility of the labor force, on the one hand, and promote spatial concentration and differentiation of economic structure among regions, on the other. The former will tend to minimize wage differentials due to remuneration, the latter will tend to increase differentials due to different endowments. Finally, the federalist system of Switzerland, based on historical differences in language, culture and religion, will impose a cost on migration contributing to wage differences due different remuneration of identical characteristics. It seems therefore promising to decompose the average wage differentials among Swiss regions into two components: a first one related to the composition of the workforce employed in different regions, and a second one related to the regional segmentation of the labor market that remunerates identical characteristics of individuals differently. The purpose of this paper is to measure a detailed decomposition to determine the contributions of each controlled individual characteristics (in both the components) to the total observed regional wage differentials.

Two streams of literature have to be considered in this context. The first one follows the hedonic wage theory of Rosen (1986), which states that the wage differentials between two occupations are given by the compensation due to different job characteristics, which themselves depend on different human capital requirements or on different working conditions. The second stream of literature follows Blinder (1973) and Oaxaca (1973) who developed a method to decompose wage differences by gender or ethnicity into different characteristics among individuals and different remuneration of the same characteristics.

As shown by Jones (1983), Oaxaca and Ransom (1999) and Horraine and Oaxaca (2001), application of the Blinder-Oaxaca methodology provokes an identification problem when attempting to estimate a detailed decomposition using sets of dummy variables. Dummy variables in the regression equations do not cause problems in estimating and decomposing total wage differentials, but generate different results in the detailed remuneration effects attributed to dummy variables because these components are not invariant to the choice of the reference group, arbitrarily chosen by the researcher. In other words, the problem arises from a lack of direct identification of all group effects when using $n-1$ dummy coefficients and the constant in the regression equations (see Suits (1984)).

Authors like Nielsen (2000), Gardeazabal and Ugidos (2005) and Yun (2005) have developed techniques to solve the identification problem. Here the “averaging of coefficients” method proposed by Yun (2005) is applied, the methodology developed by Nielsen (2000), proposing OLS regression with transformed dummy variables, being too cumbersome in presence of several sets of dummy variables (as in our case). The method proposed by Gardenazabal and Ugidos (2005) produces, under determined constraints, the same results as the averaging of coefficients method. Applying this latter method thus permits to identify a coefficient also for the reference category and to perform a complete decomposition of wage differentials.

In the following, we present the model of wage decomposition proposed by Yun (2005), describe the data used and the sample characteristics. We then present and discuss the empirical findings and draw conclusions.

2. The wage decomposition

The purpose of this paper is twofold: firstly, average observed wage differentials between Zurich and the other Swiss regions are decomposed into a part due to the different characteristics of the labor force (endowment component) and one due to different remuneration of identical characteristics (remuneration component); secondly, and more interestingly, the contribution of each explanatory variable to the two components is identified, thus relating endowment and remuneration differentials to individual characteristics.

Following the proposition of Yun (2005) in an extension to the Blinder-Oaxaca methodology to solve the identification problem, we estimate by ordinary least squares (OLS) a hedonic wage equation for each Swiss region j as proposed by Mincer (1974):

$$\ln w^j = \alpha^j + \sum_{n=1}^N X_n^j \delta_n^j + \sum_{s=1}^S \sum_{k_s=2}^{K_s} D_{sk_s}^j \beta_{sk_s}^j + \varepsilon^j \quad (1)$$

where $\ln w^j$ is the gross monthly standardized natural logarithm of wage for the region j . In equation (1), we include N continuous variables X_n (in our case human capital variables) and S sets of categorical variables D_s each including K_s categories with K_s-1 dummy variables (the first category as the reference group)¹. Finally α , β and δ are the parameters to be estimated and ε is the error with the usual properties.

To avoid for the identification problem we adopt the ‘‘averaging coefficients’’ approach proposed by Yun (2005) transforming equation (1) in a new ‘‘normalized’’ regression equation:

$$\ln w^j = \alpha^j + \sum_{s=1}^S \bar{\beta}_s^j + \sum_{n=1}^N X_n^j \delta_n^j + \sum_{s=1}^S \sum_{k_s=1}^{K_s} D_{sk_s}^j (\beta_{sk_s}^j - \bar{\beta}_s^j) + \varepsilon^j \quad (2)$$

where $\bar{\beta}_s^j = \frac{1}{K_s} \sum_{k_s=1}^{K_s} \beta_{sk_s}^j$ and $\beta_{s1_s}^j = 0$ (the coefficient for the reference category).

The dummy coefficients resulting in the normalized regression equation show the deviation of the OLS estimates of the dummy variable from the mean coefficients².

Then setting $\beta_{sk_s}^{*j} = \beta_{sk_s}^j - \bar{\beta}_s^j$ and $\alpha^{*j} = \alpha^j + \sum_{s=1}^S \bar{\beta}_s^j$, we can rewrite the ‘‘normalized’’ regression equation (2) as:

$$\ln w^G = \alpha^{*j} + \sum_{n=1}^N X_n^j \delta_n^j + \sum_{s=1}^S \sum_{k_s=1}^{K_s} D_{sk_s}^j \beta_{sk_s}^{*j} + \varepsilon^j \quad (3)$$

After estimating the parameters $\hat{\alpha}$, $\hat{\beta}$ and $\hat{\delta}$ from equation (1), the normalized regression equation (3) enables us to identify all the coefficients associated with the dummy variables (including the reference category) and the constant term.

Then applying the Blinder-Oaxaca method to the equation (3) taking Zurich³ (z) as reference region, we decompose the observed mean wage differentials with respect to the other Swiss regions (r) in two components:

¹ Using the Yun (2005) averaging approach, the choice of the reference group in equation (1) is invariant to the detailed decomposition.

² Since the $\beta_{sk_s}^{*j}$ are a linear combination of the $\beta_{sk_s}^j$, their variance can be calculated from the variance-covariance matrix of the estimated coefficients $\beta_{sk_s}^j$ from the equation (1).

$$\ln \bar{w}^z - \ln \bar{w}^r = RC + EC \quad (4)$$

where $\ln \bar{w}$ is the mean of the monthly natural logarithm of wage observed in the respective regions, RC is the *remuneration component* and EC is the *endowment component* defined as:

$$RC = \hat{\alpha}^{*z} - \hat{\alpha}^{*r} + \sum_{n=1}^N \bar{X}_n^r (\hat{\delta}_n^z - \hat{\delta}_n^r) + \sum_{s=1}^S \sum_{k_s=1}^{K_s} \bar{D}_{sk_s}^r (\hat{\beta}_{sk_s}^{*z} - \hat{\beta}_{sk_s}^{*r}) \quad (5)$$

$$EC = \sum_{n=1}^N \hat{\delta}_n^z (\bar{X}_n^z - \bar{X}_n^r) + \sum_{s=1}^S \sum_{k_s=1}^{K_s} \hat{\beta}_{sk_s}^{*z} (\bar{D}_{sk_s}^z - \bar{D}_{sk_s}^r) \quad (6)$$

where the \bar{X} and \bar{D} are the mean of the observed characteristics, the remuneration component, RC , shows the wage difference due to the different remuneration of the individual characteristics, while the endowment component, EC , reflects the part of the wage difference due to the workers characteristics.

3. Data and descriptive statistics

The empirical analysis is based on data from the Swiss Wage Structure Survey 2002 (or SWSS) that provides cross section data⁴. The survey has been implemented by the Swiss Federal Statistical Office (SFSO) among a representative sample of 45'000 firms (with more than two employees) reporting salaries, job characteristics and individual attributes of 1,1 million individual workers in Switzerland. We dispose of a SWSS' sample that includes only firms active in the private sectors, and have selected those individual observations which include all the variables used in the wage equations. The result is a representative sample of 784'139 available individual observations of occupied workers.

The SWSS 2002 survey is the first since its creation in 1996 that allows to decompose the entire Swiss sample in seven large regional sub-samples: Zurich (ZH) with 167'234 observations, Lake of Geneva Region (LRG) with 125'023 observations, Espace Mitteland (EM) with 186'416 observations, North-Western Switzerland (NWS) with 115'677 observations, Eastern Switzerland (ES) with 96'967 observations, Central Switzerland (CS) with 65'631, and Ticino (TI) with 28'191 observations⁵.

Table A1 in the appendix shows the mean and standard deviations of the variables for the seven regional sub-samples. Thus, one has gross nominal monthly standardized logarithm of wages in Swiss Francs⁶, human capital characteristics in the form of years of schooling⁷, experience (age minus years of schooling minus six), and years of tenure in the current firm. We also controlled for ten sets of dummy variables, namely gender, marital status (single, married and other marital status), five categories of part time work (i.e. less than 24%, 25%-49%, 50%-74%, 75%-89% and more than 90%), four type of contracts (industry wide

³ Vieira et al. (2005) use the national wage equation as a reference, analyzing consequently regional wage differentials in deviation to the national wage average. We prefer to use the highest wage region (i.e. in our case Zurich) as reference which enables us to confront the other labor market realities with the most important Swiss labor market, rather than with an "inexistent" average. .

⁴ In German the survey is called "*Schweizerische Lohnstrukturerhebung (LSE)*"

⁵ The seven Swiss regions are composed by the following Swiss Cantons: *Lake of Geneva Region*: Vaud, Valais, Geneva; *Espace Mitteland*: Berne, Fribourg, Solothurn, Neuchâtel, Jura; *North-Western Switzerland*: Basel-City, Basel-Country, Aargau; *Zurich*: Zurich; *Eastern Switzerland*: Glarus, Schaffhausen, Appenzell A. Rh., Appenzell I. Rh., St. Gallen, Graubünden, Thurgau; *Central Switzerland*: Lucerne, Uri, Schwyz, Obwalden, Nidwalden, Zug; *Ticino*: Ticino.

⁶ The SFSO provides individual October's 2002 gross wages in Swiss Francs standardized to 4 and 1/3 weeks at 40 hours and including 1/12 of an annual bonus where applicable.

⁷ The SWSS dataset provides a categorical variable describing the highest scholarly degree obtained by each worker. In order to estimate the return on years of schooling, the categorical variable has been transformed attributing the number of years necessary to achieve the respective degree.

collective contract, firm level collective contract, public law contract, individual contract), five types of work permits for foreigners (seasonal, annual, resident, cross-border commuter and other short run permit), four levels of required skills (most difficult tasks, high skills required, specific knowledge required, and repetitive tasks), five hierarchical levels (top manager, middle manager, manager, supervisor, no responsibility), seven firm sizes (less than 4 employees, 5-9, 10-49, 50-99, 100-199, 200-499 and more than 500), 24 sectors (according to the Swiss NOGA⁸ 2002 classification) and 24 occupations (according to a classification proposed by the SFSO in the survey).

Comparing the regions, Zurich pays the highest wages, followed by North-Western Switzerland, Lake of Geneva Region, Central Switzerland, Eastern Switzerland, Espace Mitteland and the region of Ticino.

Considering the human capital components, it is important to note that the regions show similar but statistically different levels of years of education, experience and tenure.⁹ The only remarkable difference is the low average level of years of tenure in the region of Zurich, probably due to higher incentive of worker's turnover as compared to the other Swiss regions.

Other interesting regional specificities are: a high female labor force participation in the Lake of Geneva Region and in Zurich, a high share of non-unionized workers in Zurich (72% of total employment) and the lowest one (below 50%) in Ticino – a region with a minority of Swiss workers (43%) and a 30% of cross-border commuters.

Also with respect to the required skills, Zurich and Ticino represent opposite extremes: in Ticino jobs requiring specialized knowledge represent 20% of total employment, while in Zurich the equivalent share is 33%. On the other hand, repetitive tasks represent 33% of total employment in Ticino but only 16% in Zurich. Not surprisingly, the strongest economic region also shows low shares of small firms and the highest one for very large firms.

With respect to industry composition, Zurich is the first financial place in Switzerland followed by Lake of Geneva Region and Ticino, and has the highest share of employment in the computer industry and related activities as well as in consulting. North-Western Switzerland shows relevant employment shares in the chemical industry while the highest share of manufacturing is in Ticino.

4. Empirical results

Table A2 in the Appendix shows the results of the wage estimations for each Swiss region using equation (3)¹⁰. Only few comments will be made on the resulting coefficients, as our main interest lies in the decomposition of wage differentials. Considering the human capital variables, the coefficient associated to years of schooling is significant at 1% level in all regions. The Lake of Geneva Region shows the highest rate of return on schooling, followed by Central Switzerland and Zurich, whilst the lowest is found in Ticino. Similarly, the highest rates of return on experience are observed in the region of Zurich and in Central Switzerland.

With respect to gender variables, not surprisingly, coefficients demonstrate wage premiums for males in all regions, but gender differences are more accentuated in the economically weak regions (Eastern Switzerland, Ticino, Central Switzerland) than in the strong ones (Zurich, Lake of Geneva Region).

⁸ NOGA (in French: “*Nomenclature Générale des Activités économiques*”) is the official general classification of economical activities used in Switzerland.

⁹ T-tests of equal means show that the mean values of Zurich are statistically different at the 99% level from the mean values observed in the other regions. The detailed results are available from the authors.

¹⁰ The table with the wage estimates of equation (1) is available from the authors.

Regarding workers' origin, Swiss earn significantly more than the regional mean in all the regions except for the Lake of Geneva Region, but the wage premium estimated for foreign workers with an annual permit is higher than the wage premium estimated for Swiss workers in four regions, i.e. Zurich, Lake of Geneva Region, Central Switzerland and Ticino. Differences are observed in the signs of the coefficients associated to cross-border commuters among the Swiss regions. This category shows a positive wage premium in Lake of Geneva Region, in North-Western Switzerland and in Eastern Switzerland, but no significant difference is observed in the Central Switzerland (since cross-border commuter cannot enter in that region due to labor market regulation). In Ticino cross-border commuters suffer the highest wage penalty, followed by Zurich and Espace Mittelland.

Turning now to the decomposition of the wage differentials by regions, Table 1 illustrates the overall results (for the detailed results, see Table A3 in the appendix)

Table 1: Decomposition of wage differentials between Zurich and the other regions of Switzerland

Region	Wage differential Zurich over Region	% due to endowment	% due to remuneration
North-Western Switzerland	8.5 %	48	52
Lake of Geneva	10 %	70	30
Central Switzerland	13.3 %	48	52
North-Eastern Switzerland	18.7 %	48	52
Espace Mittelland	19.7 %	54	46
Ticino	33.7 %	45	55

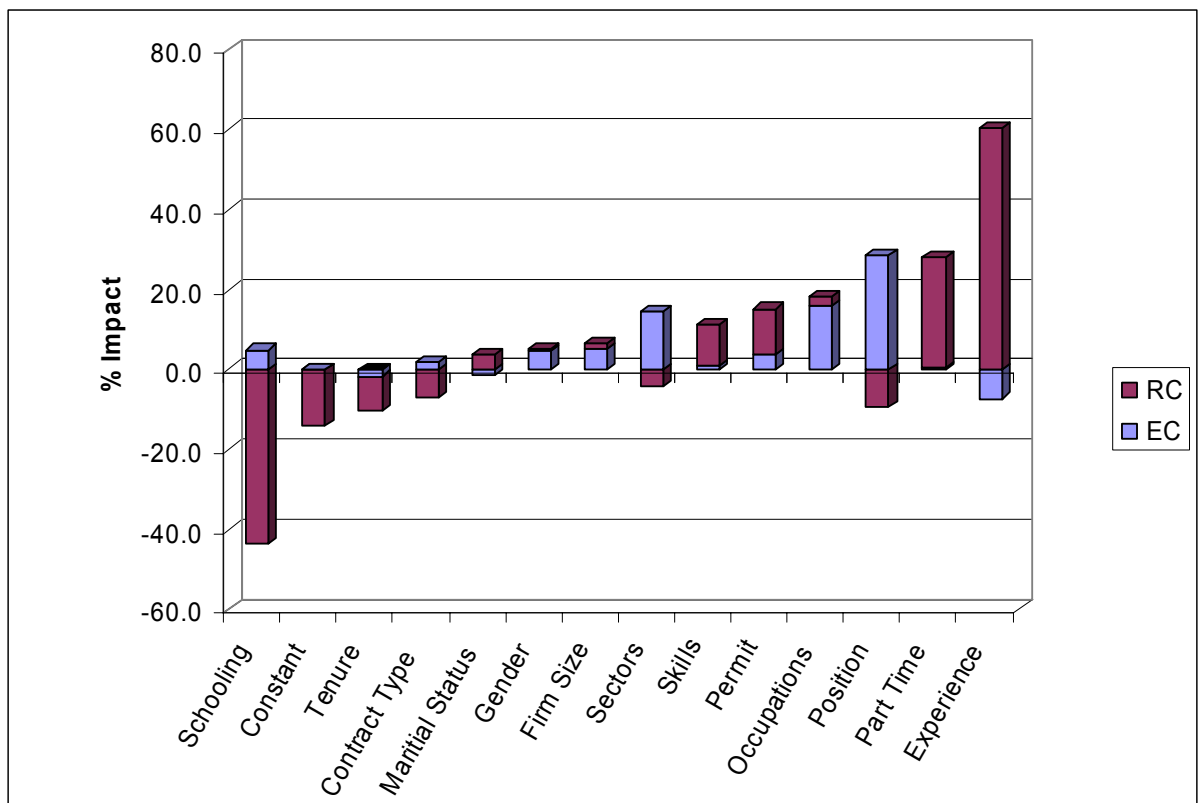
For every region, the table shows the total differential between average nominal wages,¹¹ indicates the percentage of the differential explained by the regional difference in average worker characteristics (i.e. the endowment component, *EC*) as well as the differential due to different remuneration of identical characteristics (i.e. remuneration component, *RC*).

The results show, first, an important variation in wage differentials among Swiss regions and indicate, second, that between 45 and 70 % of the differential can be explained by endowment. The table demonstrates no obvious correlation between the wage differential and its composition, but the highest share of the endowment component is found for the second “wealthiest” region, and the lowest share of endowment for the “poorest” region. Interestingly enough, number two in the ranking is the Lake of Geneva region and the poorest one is the Ticino region, the two representing the banking places number two and three behind Zurich, respectively. We conclude that endowment cannot only be related to the sectoral composition of the economy, but depends on other components too. This will now be discussed, looking at the impact of single characteristics on the two components.

¹¹ Using nominal wages, estimated differences will reflect eventual differences in the cost of living to an unknown extent. It is reasonable to assume, that these will be comprised in the remuneration term, among other effects, like immobility, discrimination etc.. However, this will not interfere with the interpretation of the impact of single characteristics on the wage differentials.

The detailed results are again to be found in Table A3 in the appendix. Given its complexity (two components and the total for 6 regions for all coefficients), we have chosen to illustrate the results for only three out of the six regions, and using graphs that illustrate the relevance of the single characteristics on the two components “simultaneously”. Figure 1 contains the results for the Lake of Geneva region. The characteristics are ordered in ascending order of the overall impact – an overall negative impact illustrating “advantages” of the region over Zurich for this characteristic, and vice versa for an overall positive impact. The bright part of every column measures the endowment effect, the dark one the remuneration effect.

Figure 1: Relevance of characteristics for Endowment (EC) and Remuneration (RC) between Zurich and the **Lake of Geneva Region**



The results for the Lake of Geneva Region confirm our expectations, according to which, endowment effects should have to do with structural (long term) characteristics of the economy, remunerations effects should be reflected in individual characteristics earning different salaries due to immobility and discrimination. Eventual differences in regional purchasing power are not related to any characteristic and should end up in the constant.

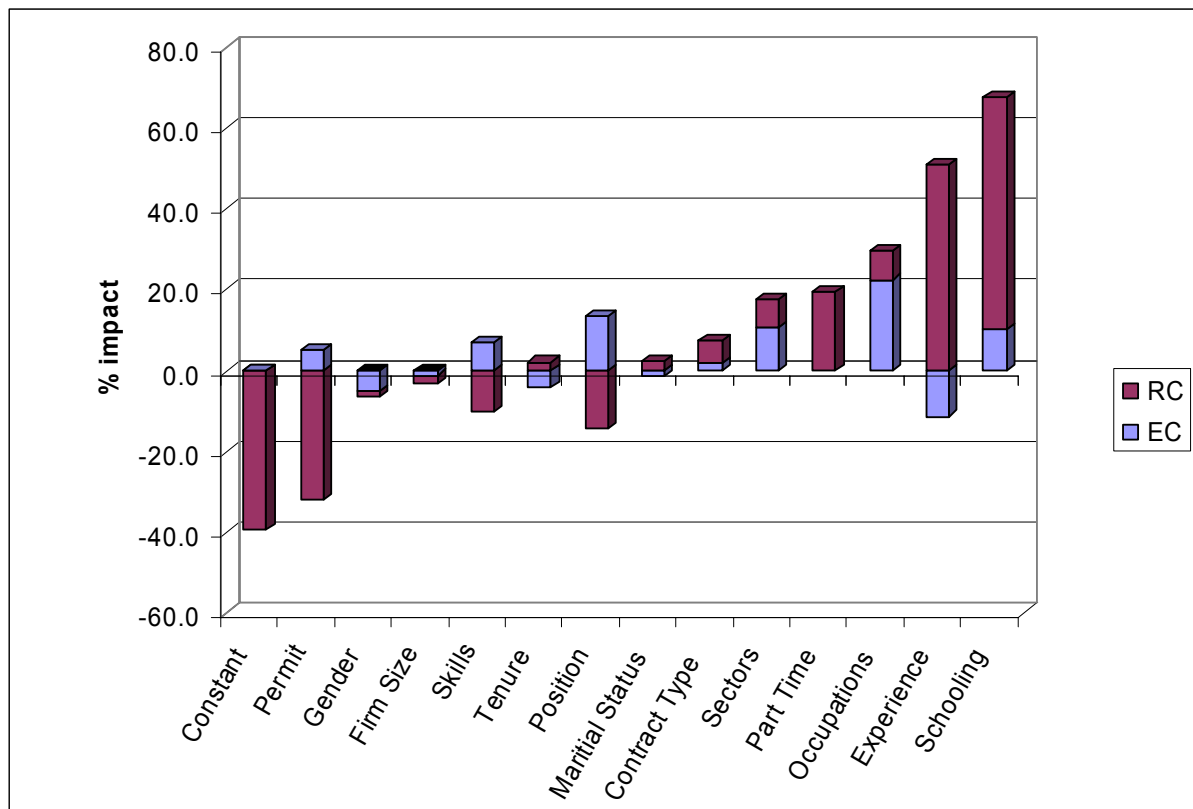
Looking at remuneration effects first, we see that for the Lake of Geneva Region like for the other regions, human capital variables play an important role in wage differentials. Years of schooling attenuate the differentials in the Lake of Geneva Region (and in Central Switzerland), while years of experience accentuate the wage differentials between Zurich and then Lake of Geneva Region (and all other Swiss regions), and finally, tenure has a positive remuneration effect for Geneva. Among the other variables, part time work exhibits a strong remuneration effect in favor of Zurich. Overall, remuneration effects seem to counterbalance each other in the case of the Lake of Geneva Region – which explains its 30 % contribution to overall wage differentials.

Considering the endowment effect (bright part of the pillars), the relevant variables are characteristics of the jobs and the economy (presence of top management positions, occupations, sectors). In the Lake of Geneva Region, these “structural” variables all provoke an endowment effect in favor of Zurich – from there the 70% contribution to overall differentials.

The constant indicates unexplained, possibly purchasing power related advantages of the Lake of Geneva Region.

Turning now to another “rich” region, North-western Switzerland (with agglomeration of Basel), we find overall similar results but with some interesting differences, as illustrated by Figure 2. Both experience and schooling show a endowment effect in disfavor of the region, while tenure is on balance. Hence, human capital is remunerated better in Zurich. An important remuneration effect in favor of the region stems from the variable permit. Foreign (trans-border) labor force is remunerated better in North-western Switzerland than in Zurich.

Figure 2: Relevance of characteristics for Endowment (EC) and Remuneration (RC) between Zurich and North-western Switzerland

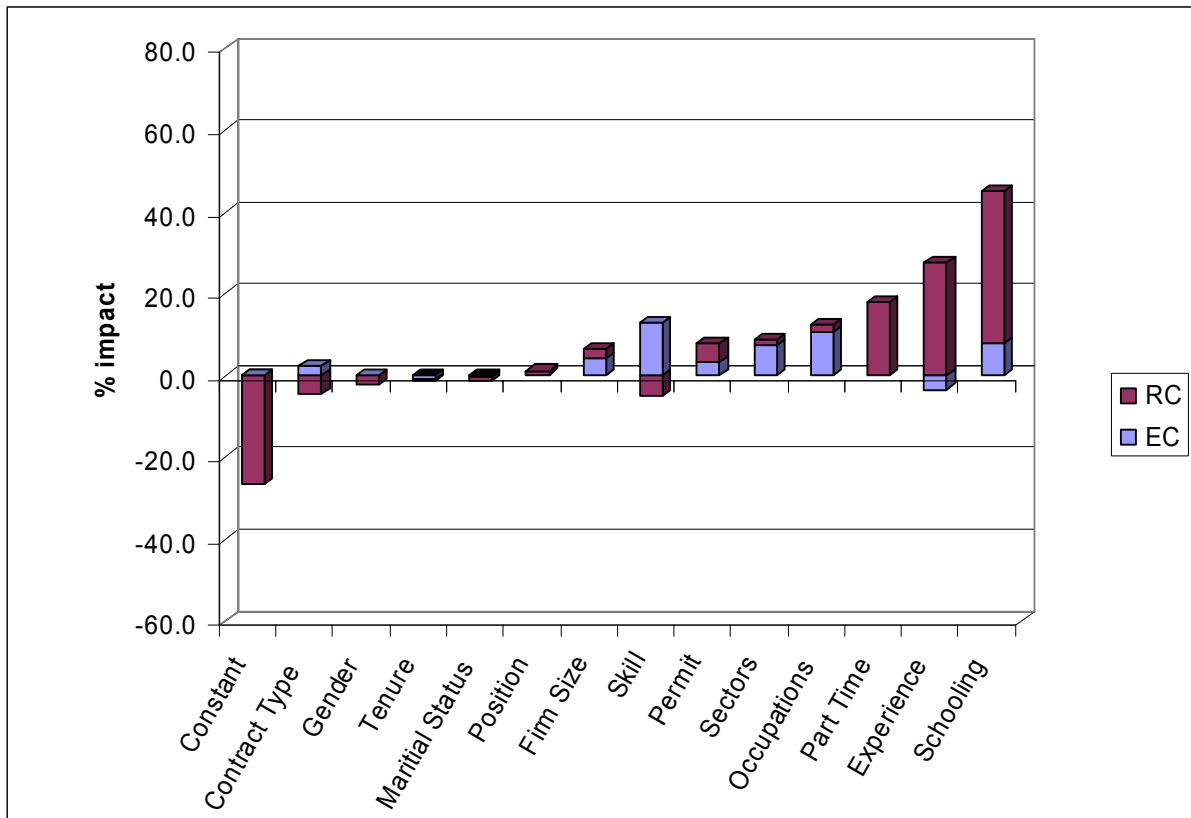


Concerning endowment effects, it is confirmed also for this region that the type of occupation, sectoral structure, hierarchical position and requested skills influence wage differentials via long term effects. However, in contrast to the Lake of Geneva Region, North-western Switzerland exhibits also strong remuneration effects for skills and position, which counterbalance the unfavorable endowment effect. In other words, structural effects favor on average a higher presence of skills and positions in Zurich, but they are less remunerated due to eventual mobility and discrimination effects.

Looking, finally, at the region of Ticino, with its highest negative differential with respect to Zurich, we find similarities and important differences as compared to the richer regions. While like in the case of North-western Switzerland, we observe important remuneration

effects via schooling, experience and part time, and endowment effect via structural variables, all effects are in disfavor of Ticino. The only relevant effect in favor of the region stems from the constant, and hence probably from a lower cost of living.

Figure 3: Relevance of characteristics for Endowment (EC) and Remuneration (RC) between Zurich and Ticino



Across all regions, required skills have always a high and positive endowment effect (i.e. rise the differentials), while the sign of the remuneration component is always high and negative (i.e. reduce the gaps). The total effect attributed to skills is positive (i.e. the endowment effect in favor of Zurich dominates) with the exception of North-Western Switzerland. Similarly, firm size increases the wage differentials in four regions, both total remuneration and total endowment components working in favor of Zurich, and only for North-Western Switzerland both components have a negative sign, and as consequence, firm size attenuates the wage differential for this region. Finally, industry structure and types of occupation, always explain a share of the existing positive wage differential between Zurich and the other Swiss regions due to the endowment component.

5. Conclusions

In this paper, the wage differentials among different Swiss regions have been decomposed in a differential due to individual endowments and one due to a different remuneration of the characteristics (market). This has been done applying the “averaging coefficients” approach developed by Yun (2005) in an extension to the Blinder-Oaxaca methodology to solve the identification problem for wage differentials detailed decomposition.

The region of Zurich has the highest average wage in Switzerland and has been taken as reference in the regional wage decomposition.

The results show that with respect to the richest Swiss region, Zurich, lower wages in the other regions are to a large extent (45% - 70%) due to different endowment, and thus to long run location decisions of firms and households leading to different regional economies. In other words, less than half of the wage differential is in general due to different remuneration of identical characteristics. Remuneration differences among regions vary with experience, schooling and part time work, while endowment depends mainly on economic structure, firm size and hierarchical position (skills). Especially stronger economic regions can compensate disadvantages from endowment through remuneration of human capital.

The variables which exert more influence in explaining the wage gap between the region of Zurich and the other Swiss regions are years of potential experience, percentage of working time, firm size and the economic structure, namely sectors and occupations. On the other hand, years of tenure, marital status, type of contract, firm size and required skills do not play an important role in explaining the wage differentials except for isolated cases.

An important question arises with respect to the constant. Having performed analyses on nominal wages, the constant must contain important information on regional differences in cost of living. This question provides scope for further research.

Appendix

Table A1: Means and standard deviations

	Zurich		Lake of Geneva		Espace Mittelland		North-Western S.		Eastern Switzerland		Central Switzerland		Ticino	
	<i>mean</i>	<i>s.d.</i>	<i>mean</i>	<i>s.d.</i>	<i>mean</i>	<i>s.d.</i>	<i>mean</i>	<i>s.d.</i>	<i>mean</i>	<i>s.d.</i>	<i>mean</i>	<i>s.d.</i>	<i>mean</i>	<i>s.d.</i>
Natural log wage	8,76	(0,42)	8,67	(0,43)	8,58	(0,34)	8,68	(0,38)	8,59	(0,35)	8,64	(0,37)	8,47	(0,40)
Schooling (years)	12,23	(2,16)	12,11	(2,31)	11,77	(2,04)	12,01	(2,13)	11,67	(2,04)	11,86	(2,03)	11,63	(2,24)
Experience (years)	21,76	(11,56)	22,35	(11,24)	22,80	(11,66)	22,97	(11,43)	22,84	(11,70)	21,83	(11,49)	22,74	(11,25)
Tenure (years)	8,11	(8,33)	8,76	(8,65)	9,29	(8,99)	9,53	(9,34)	9,42	(9,10)	8,95	(8,94)	9,05	(8,49)
Male	0,64	(0,48)	0,61	(0,49)	0,64	(0,48)	0,68	(0,47)	0,70	(0,46)	0,69	(0,46)	0,64	(0,48)
Female	0,36	(0,48)	0,39	(0,49)	0,36	(0,48)	0,32	(0,47)	0,30	(0,46)	0,31	(0,46)	0,36	(0,48)
Single	0,36	(0,48)	0,30	(0,46)	0,33	(0,47)	0,32	(0,46)	0,32	(0,46)	0,36	(0,48)	0,30	(0,46)
Married	0,54	(0,50)	0,60	(0,49)	0,58	(0,49)	0,59	(0,49)	0,60	(0,49)	0,57	(0,50)	0,61	(0,49)
Other status	0,09	(0,29)	0,11	(0,31)	0,10	(0,30)	0,09	(0,29)	0,09	(0,28)	0,07	(0,26)	0,09	(0,29)
PartTime 0-24%	0,01	(0,10)	0,01	(0,09)	0,01	(0,11)	0,01	(0,10)	0,01	(0,10)	0,01	(0,11)	0,01	(0,07)
PartTime 25-49%	0,03	(0,16)	0,03	(0,16)	0,03	(0,18)	0,03	(0,16)	0,03	(0,16)	0,03	(0,16)	0,02	(0,13)
PartTime 50-74%	0,05	(0,23)	0,07	(0,25)	0,07	(0,25)	0,05	(0,23)	0,05	(0,21)	0,05	(0,21)	0,05	(0,22)
PartTime 75-89%	0,05	(0,23)	0,07	(0,26)	0,06	(0,24)	0,05	(0,22)	0,04	(0,20)	0,04	(0,20)	0,05	(0,21)
PartTime +90%	0,85	(0,35)	0,83	(0,38)	0,83	(0,38)	0,86	(0,35)	0,87	(0,33)	0,87	(0,33)	0,88	(0,33)
Industry CC	0,20	(0,40)	0,30	(0,46)	0,27	(0,45)	0,23	(0,42)	0,27	(0,44)	0,28	(0,45)	0,33	(0,47)
Firm CC	0,06	(0,24)	0,09	(0,29)	0,10	(0,30)	0,08	(0,28)	0,07	(0,26)	0,07	(0,25)	0,19	(0,39)
Public Law C.	0,02	(0,13)	0,03	(0,16)	0,03	(0,16)	0,01	(0,11)	0,03	(0,17)	0,02	(0,13)	0,02	(0,12)
Individual C.	0,72	(0,45)	0,58	(0,49)	0,59	(0,49)	0,67	(0,47)	0,63	(0,48)	0,64	(0,48)	0,47	(0,50)
Swiss	0,75	(0,43)	0,59	(0,49)	0,77	(0,42)	0,63	(0,48)	0,68	(0,47)	0,79	(0,41)	0,43	(0,50)
Seasonal	0,01	(0,09)	0,02	(0,14)	0,01	(0,10)	0,01	(0,07)	0,03	(0,16)	0,01	(0,11)	0,02	(0,15)
Annual	0,05	(0,22)	0,06	(0,23)	0,04	(0,19)	0,05	(0,21)	0,06	(0,23)	0,05	(0,23)	0,03	(0,18)
Resident	0,17	(0,38)	0,22	(0,41)	0,15	(0,36)	0,16	(0,37)	0,18	(0,39)	0,13	(0,34)	0,21	(0,41)
Cross-border	0,01	(0,12)	0,10	(0,30)	0,03	(0,17)	0,14	(0,35)	0,05	(0,22)	0,00	(0,04)	0,30	(0,46)
Other permits	0,01	(0,10)	0,01	(0,11)	0,01	(0,08)	0,02	(0,14)	0,01	(0,09)	0,01	(0,10)	0,00	(0,06)
Difficult tasks	0,11	(0,31)	0,08	(0,27)	0,07	(0,25)	0,09	(0,29)	0,08	(0,27)	0,09	(0,28)	0,07	(0,26)
High skill tasks	0,33	(0,47)	0,23	(0,42)	0,26	(0,44)	0,29	(0,45)	0,29	(0,45)	0,30	(0,46)	0,20	(0,40)
Specific knowledge	0,41	(0,49)	0,44	(0,50)	0,42	(0,49)	0,44	(0,50)	0,42	(0,49)	0,42	(0,49)	0,40	(0,49)
Repetitive tasks	0,16	(0,36)	0,26	(0,44)	0,25	(0,43)	0,18	(0,38)	0,21	(0,41)	0,20	(0,40)	0,33	(0,47)
Top manager	0,07	(0,26)	0,07	(0,26)	0,07	(0,25)	0,07	(0,25)	0,07	(0,26)	0,08	(0,27)	0,08	(0,27)
Middle manager	0,08	(0,27)	0,09	(0,28)	0,07	(0,26)	0,08	(0,27)	0,08	(0,27)	0,09	(0,29)	0,08	(0,27)
Manager	0,14	(0,35)	0,12	(0,32)	0,11	(0,31)	0,10	(0,30)	0,12	(0,33)	0,13	(0,34)	0,12	(0,33)
Supervisor	0,10	(0,30)	0,12	(0,32)	0,09	(0,29)	0,07	(0,26)	0,08	(0,26)	0,08	(0,27)	0,12	(0,33)
No responsibility	0,61	(0,49)	0,61	(0,49)	0,66	(0,47)	0,68	(0,47)	0,66	(0,47)	0,62	(0,49)	0,60	(0,49)
Firm size 2-4	0,05	(0,21)	0,07	(0,25)	0,06	(0,23)	0,05	(0,22)	0,06	(0,24)	0,07	(0,26)	0,09	(0,29)
Firm size 5-9	0,10	(0,30)	0,13	(0,34)	0,13	(0,33)	0,10	(0,30)	0,12	(0,32)	0,13	(0,34)	0,17	(0,37)
Firm size 10-49	0,23	(0,42)	0,29	(0,45)	0,29	(0,46)	0,26	(0,44)	0,33	(0,47)	0,33	(0,47)	0,30	(0,46)
Firm size 50-99	0,10	(0,30)	0,11	(0,32)	0,11	(0,31)	0,12	(0,32)	0,12	(0,32)	0,13	(0,34)	0,15	(0,36)
Firm size 100-199	0,10	(0,30)	0,11	(0,32)	0,10	(0,31)	0,12	(0,32)	0,11	(0,31)	0,11	(0,32)	0,11	(0,32)
Firm size 200-499	0,12	(0,33)	0,11	(0,32)	0,12	(0,32)	0,15	(0,35)	0,12	(0,33)	0,12	(0,32)	0,09	(0,29)
Firm size +500	0,30	(0,46)	0,17	(0,38)	0,19	(0,40)	0,20	(0,40)	0,15	(0,35)	0,11	(0,31)	0,08	(0,27)
Observations	167'234		125'023		186'416		115'677		96'967		65'631		28'191	

Note: we also include 24 sectors and 24 occupations whose descriptive statistics is available from authors.

Table A2: Estimation results of the normalized equation regressions

	<i>ZH</i>	<i>LGR</i>	<i>EM</i>	<i>NWS</i>	<i>ES</i>	<i>CS</i>	<i>TI</i>
Constant	7.997 (1196.48)**	8.011 (1066.37)**	8.041 (1488.23)**	8.030 (1099.52)**	8.058 (1062.46)**	7.936 (722.70)**	8.073 (500.99)**
Schooling	0.037 (99.16)**	0.040 (94.47)**	0.031 (94.24)**	0.033 (76.64)**	0.031 (66.65)**	0.039 (62.05)**	0.028 (31.14)**
Experience	0.024 (100.83)**	0.018 (63.18)**	0.017 (88.92)**	0.020 (77.88)**	0.017 (63.58)**	0.021 (59.68)**	0.017 (29.71)**
Experience^2	-0.00038 (80.90)**	-0.00027 (47.43)**	-0.00027 (72.85)**	-0.00032 (62.76)**	-0.00028 (52.42)**	-0.00034 (47.65)**	-0.00027 (24.06)**
Tenure	0.003 (12.63)**	0.004 (16.44)**	0.004 (22.91)**	0.002 (10.80)**	0.003 (13.70)**	0.002 (6.20)**	0.003 (5.18)**
Tenure^2	-0.00002 (2.39)*	-0.000046 (5.79)**	-0.000043 (8.48)**	-0.0000028 (0.44)	-0.000018 (2.63)**	-0.0000007 (0.08)	0.0000065 (0.41)
Male	0.065 (83.41)**	0.063 (67.47)**	0.074 (110.60)**	0.069 (78.18)**	0.091 (94.12)**	0.084 (65.53)**	0.087 (45.83)**
Female	-0.065 (83.41)**	-0.063 (67.47)**	-0.074 (110.60)**	-0.069 (78.18)**	-0.091 (94.12)**	-0.084 (65.53)**	-0.087 (45.83)**
Part Time 0-24%	0.041 (8.49)**	0.046 (7.46)**	0.051 (14.18)**	0.055 (10.08)**	0.057 (10.46)**	0.048 (6.87)**	0.068 (4.30)**
Part Time 25-49%	-0.027 (8.23)**	-0.016 (4.19)**	-0.013 (5.41)**	-0.011 (3.05)**	-0.011 (3.04)**	-0.017 (3.47)**	-0.001 (0.11)
Part Time 50-74%	-0.021 (8.09)**	-0.005 (1.60)	-0.016 (8.88)**	-0.019 (6.95)**	-0.007 (2.37)*	-0.023 (5.84)**	0.018 (2.64)**
Part Time 75-89%	-0.003 (1.00)	-0.001 (0.50)	-0.016 (8.39)**	-0.015 (5.55)**	-0.019 (5.98)**	0.001 (0.30)	-0.033 (4.69)**
Part Time +90%	0.009 (4.87)**	-0.024 (10.97)**	-0.005 (3.90)**	-0.010 (4.63)**	-0.020 (9.13)**	-0.009 (3.06)**	-0.051 (9.86)**
Swiss	0.016 (7.76)**	-0.009 (4.80)**	0.034 (21.27)**	0.045 (22.55)**	0.040 (20.95)**	0.016 (3.90)**	0.013 (2.62)**
Seasonal	-0.018 (3.22)**	-0.052 (11.68)**	-0.037 (8.65)**	-0.062 (8.42)**	-0.045 (11.59)**	-0.021 (2.76)**	-0.032 (3.52)**
Annual	0.042 (14.54)**	0.041 (13.89)**	0.013 (5.05)**	0.043 (14.19)**	0.007 (2.53)*	0.044 (8.69)**	0.030 (3.82)**
Resident	0.005 (2.33)*	0.006 (3.04)**	0.025 (14.01)**	0.034 (15.18)**	0.025 (11.65)**	0.018 (4.08)**	-0.005 (0.96)
Commuter	-0.015 (3.26)**	0.024 (9.82)**	-0.013 (4.70)**	0.015 (6.34)**	0.012 (3.98)**	-0.016 (0.91)	-0.048 (9.18)**
Other permit	-0.029 (5.44)**	-0.010 (1.80)	-0.023 (4.38)**	-0.074 (17.25)**	-0.039 (6.01)**	-0.043 (5.21)**	0.042 (2.03)*
Difficult tasks	0.202 (97.97)**	0.173 (61.30)**	0.131 (65.56)**	0.151 (61.85)**	0.167 (63.26)**	0.150 (43.45)**	0.150 (25.96)**
High skill tasks	0.025 (22.13)**	0.010 (7.05)**	0.029 (28.23)**	0.045 (35.34)**	0.026 (18.92)**	0.029 (15.92)**	0.032 (10.39)**
Specific knowledge	-0.072 (62.69)**	-0.053 (38.61)**	-0.039 (40.41)**	-0.052 (41.70)**	-0.057 (42.61)**	-0.050 (27.92)**	-0.045 (15.90)**
Repetitive tasks	-0.155 (87.73)**	-0.130 (70.31)**	-0.121 (91.27)**	-0.143 (76.24)**	-0.135 (70.80)**	-0.129 (49.15)**	-0.137 (37.86)**
Observations	167234	125023	186416	115677	95967	65631	28191

Note: We also controlled for marital status, contract type, hierarchical levels, firm size, sectors and occupations. Absolute value of t-statistics in parentheses, * significant at 5%, ** significant at 1%.

Table 3: Decomposition of the wage differential in percentage, reference region Zurich

	Lake of Geneva Reg.			Espace Mitteland			North-Western S.			Eastern Switzerland			Central Switzerland			Ticino		
	<i>EC</i>	<i>RC</i>	<i>Total</i>	<i>EC</i>	<i>RC</i>	<i>Total</i>	<i>EC</i>	<i>RC</i>	<i>Total</i>	<i>EC</i>	<i>RC</i>	<i>Total</i>	<i>EC</i>	<i>RC</i>	<i>Total</i>	<i>EC</i>	<i>RC</i>	<i>Total</i>
Lnw Differential			0,095			0,180			0,082			0,171			0,125			0,287
Total	70,0	30,0	100,0	53,9	46,1	100,0	47,9	52,1	100,0	47,8	52,2	100,0	48,3	51,8	100,0	44,6	55,4	100,0
Constant	0,0	-14,0	-14,0	0,0	-24,5	-24,5	0,0	-39,3	-39,3	0,0	-35,6	-35,6	0,0	48,6	48,6	0,0	-26,4	-26,4
Schooling	4,9	-43,7	-38,8	9,6	38,0	47,6	10,2	57,3	67,6	12,3	39,4	51,7	11,0	-24,2	-13,3	7,8	37,1	44,9
Experience	-7,3	60,1	52,8	-3,5	47,1	43,6	-11,3	50,8	39,5	-3,6	49,0	45,4	-0,9	21,4	20,5	-3,3	27,8	24,5
Tenure	-1,7	-8,4	-10,2	-1,6	-3,0	-4,6	-4,2	2,1	-2,0	-1,9	-2,2	-4,1	-1,6	4,4	2,7	-0,9	-0,4	-1,2
Gender	4,4	0,5	4,9	0,1	-1,4	-1,4	-5,0	-1,6	-6,6	-4,2	-6,0	-10,3	-5,3	-5,8	-11,0	0,2	-2,1	-1,9
Marital Status	-1,3	3,6	2,3	-0,4	0,1	-0,3	-1,4	2,3	1,0	-0,7	2,4	1,7	-0,4	3,4	3,0	-0,5	-0,7	-1,2
Part Time	0,6	27,2	27,8	0,3	6,6	6,9	-0,1	19,3	19,2	-0,2	14,3	14,0	-0,4	11,9	11,5	-0,1	18,0	17,9
Contract Type	2,0	-7,2	-5,1	1,2	1,6	2,7	1,9	5,5	7,4	0,2	5,6	5,8	0,9	-2,5	-1,6	2,4	-4,4	-2,0
Permit	3,8	11,4	15,2	0,3	-9,0	-8,7	5,1	-31,8	-26,7	1,0	-11,0	-10,1	-0,5	-1,9	-2,5	3,4	4,7	8,0
Skill	28,5	-9,4	19,1	14,0	-10,1	3,9	13,3	-14,3	-1,0	10,2	-4,6	5,7	10,0	-8,8	1,2	12,9	-4,9	8,0
Task	0,8	10,4	11,2	3,6	-4,2	-0,6	7,1	-10,2	-3,1	2,0	-8,0	-6,0	-1,7	-10,9	-12,7	0,3	0,9	1,3
Firm Size	4,9	1,7	6,6	1,9	-1,7	0,2	-1,1	-2,0	-3,1	2,1	1,1	3,2	4,4	6,8	11,2	4,1	2,5	6,6
Sectors	14,6	-4,5	10,1	11,5	5,6	17,2	10,7	6,8	17,5	13,1	3,1	16,1	16,6	-4,8	11,8	7,5	1,5	9,0
Occupations	15,9	2,2	18,1	17,0	1,0	18,0	22,5	7,0	29,6	17,6	5,0	22,6	16,2	14,3	30,5	10,8	1,7	12,4

Note: Reference region Zurich. EC = endowment component, RC = remuneration component. Lnw Differential is the difference between the natural logarithm of the gross monthly wage in Zurich and the other regions respectively. Since the region of Zurich has been taken as the reference region, and since it has the highest wage among the Swiss regions, the total wage differential is always a positive value that has been normalized to one hundred. Then positive signs of the values in Table 3 must be interpreted as a contribution to the wage differential in favor of Zurich, whilst the negative sign indicates a contribution in disfavor of Zurich

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