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Abstract

The main purpose of the article is to examine workers' mobility expectations under the risk of investments in human capital. We focus on the earnings risk associated with investments in human capital. In particular, we attempt to identify the specific risk for occupational groups and then conduct a descriptive analysis of the mobility expectations in occupational groups with different risk levels. The empirical analysis is based on the cross-sectional data from the survey Bilans Kapitału Ludzkiego (Human Capital Balance).

Keywords: human capital, risk, expected mobility
JEL: J24, J62

Introduction

In the last few years there has been a growing interest in the risk of investments in human capital. Despite a lack of consensus in the literature on how to measure risk, researchers stress that it is an integral part of investments in human capital and should not be ignored. Uncertainty about the outcome of educational decisions is relevant not only for students, but also for school administrators and policy makers [Hartog, Diaz Serrano, 2014].

Investments in human capital are connected with decisions about the distant future, which is not known before the investment. Individuals may choose between different types of education and occupations. However, they cannot predict future economic conditions or technological and labor market changes, which have an impact on the demand for particular types of human capital. Furthermore, individuals cannot predict their own ability

and human capital after the investment is completed. Since future events and conditions cannot be predicted by an individual, that person's return on investments in human capital is inherently uncertain [Hartog, 2011]. As a result, individuals face a risk that actual outcomes may be other than expected. Since investments in human capital are connected with risk, individuals may undertake different investment behaviors depending on their attitude towards risk.

The risk of investments in human capital has an impact on educational decisions and career choices. It is also a determinant of workers' behavior after they enter the labour market, such as post-schooling investments (for example, work-related training) and job mobility. Empirical evidence suggests that if workers accept a higher level of earnings risk, they are more likely to move to other jobs [McGoldrick and Robst, 1996]. Several studies consider the effect of changes in the labour market, which can be perceived by individuals as a predictor for possible earnings risk, on different forms of mobility. For example, Devereux [2002] found that both women and men are more likely to move to higher-paid occupations when unemployment rate falls. In a recent paper Dex and Bukodi [2013], it was observed that there are gender differences in mobility responses to labor market fluctuations. For example, when the situation in the labor market worsens (unemployment rates are rising) women are reported to be less likely to change jobs and occupations than men. Skriabikova, Argaw and Maier [2013] argue that job change is associated with unpredictable benefits, so it can be treated as a risky situation. They have observed that during the early stages of career more risk-averse individuals are less likely to change jobs.

Based on the available evidence it is expected that individuals who face a higher risk of investment in human capital are more likely to report expected mobility. This does not imply that job mobility is determined only by the risk of investments in human capital, but it does suggest that risk may be important in explaining the mobility behavior and mobility expectations.

A substantial body of literature deals with the risk of investments in human capital and job mobility, but there is little research on the relationship between these two categories. This paper attempts to shed some light on this issue. The goal of the study is to examine workers' mobility expectations under different risk of investments in human capital levels. We focus only on the earnings risk associated with investments in human capital and ignore other types of risk. In particular, we attempt to identify the risk of investment in human capital specific for occupational groups and then conduct a descriptive analysis of the mobility expectations in occupational groups with different levels of earnings risk.

The empirical analysis is based on the cross-sectional data from the survey Human Capital Balance (Bilans Kapitału Ludzkiego) for the year 2012. The results suggest no difference in workers' expected mobility between more and less risky occupational groups. We also found that women and men did not differ in their expectations on mobility under different levels of earnings risk.

The paper is organized as follows. In the next section we briefly present the relevant literature. Next, we describe the data and empirical analysis strategy. The following section describes major findings and the last section summarizes those finding and provides conclusions.

Literature Review

One of the major studies of the risk associated with investments in human capital is the work by Levhari and Weiss [1974].[3] The authors incorporate the element of risk into standard human capital theory, focusing on the effect of the risk and uncertainty on investments in human capital.

In most empirical studies, risk is associated with post-schooling earnings volatility and uncertain outcomes of investments in education. Previous research has documented that return on investments in human capital varies over time [De la Fuente, Ciccone, 2003]. In addition, several studies have shown that individuals face a different level of earnings risk across occupational and educational cells (see, for example [Berkhout, Hartog and Webbink, 2010; Diaz-Serrano, Hartog, Nielsen, 2008]). There is also evidence, stemming from work by Pereira and Martins [2002] that estimated returns on investments in human capital vary across different countries, as does the level of risk. Literature on the subject has focused on how risk impacts educational choice. For example, Raita [2005] found that when individuals choose between leaving school and waiting, they takes into account high earnings volatility, which reflects risk of investments in human capital. Based on Spanish data Diaz Serrano and Hartog [2007] suggested that risk has a negative effect on investments in education. However, findings obtained by Hartog, Ding and Liao [2011] reach a different conclusion and do not support the basic prediction of Levhari and Weiss [1974] that increasing risk reduces investments in human capital. The authors demonstrate that in the case of Chinese students expected risk has no effect on their educational decisions.

On the other hand, the risk of investments in human capital is to impact occupational choice. Hartog and Diaz-Serrano [2004] provide evidence that individuals who work in the public sector, which is considered less uncertain in terms of earnings, are more risk averse. Bonin, Dohmen, Falk, Huffman and Sunde [2007] document that individuals in occupations with more volatile earnings are more willing to take risk.

Research that addresses the relationship between job mobility and risk of investments in human capital is limited. McGoldrick and Robst [1996] show that high earnings risk leads to higher probability of job change both for men and women. This research also found that the effect of risk is greater on female than on male respondents. Recent studies suggest that workers whose job is not consistent with their level of education are more willing to switch to better paying jobs [CBOS, 2013]. Overeducated workers are found

to be more likely to expect involuntary job loss [McGuinness, Wooden and Hahn, 2012]. Both undereducated and overeducated workers are likely to face a high risk of investment in firm-specific human capital, which could be associated with expected mobility in the future.

In human capital theory, the explanation of the impact of investments in training on job mobility is based on the idea of a distinction between general and specific human capital [Becker, 1962]. This difference becomes especially crucial when analyzing investment decisions by individuals after completing their education and beginning to work. According to human capital theory, the effects of general training are useful for many employers in the labor market, because general human capital can be easily transferred between different jobs, positions, occupations, and employers. By contrast, the effects of specific training are valuable only for the employer who offers this type of training, and have limited use elsewhere. The cost of general training is fully paid by the worker, while the cost of specific training is shared between the employer and employee. From the employee's perspective, investments in general training could be considered safe since they bring better career, and more labor market opportunities. The acquisition of specific human capital makes employees more vulnerable to new situations in the labor market as it could be more costly and time consuming to adapt to a changing demand for skills. From the employer's perspective, however, investments in specific training are less risky because workers cannot transfer their specific human capital so easily[4].

The focus of recent research on job mobility has been on factors that impact actual job changing and turnover intentions, with particular attention paid to gender differences. Sousa-Poza and Henneberger [2004] have demonstrated that determinants of turnover intentions vary across countries and, more importantly, are subjective in nature. Their findings also support the theory that there is a negative relationship between the unemployment rate and turnover intentions. Gesthuizen [2009] analyzed the effect of subjective perceptions of job attributes on mobility for men and women. The author found that wage dissatisfaction and some nonfinancial issues (dissatisfaction with the working hours) have a stronger impact on mobility for women than for men. Böckerman and Ilmakunnas [2009] investigated how negative working conditions influence actual job changes and intentions. They demonstrated that dissatisfaction with working conditions leads to more job search behavior and actual job changes, though the effect was stronger when measured in terms of workers' intentions than in terms of actual separations.

The problem of voluntary quits and turnover intentions has also received considerable attention in human resource management. Much literature focuses on the effect of various HR practices on employees quit intentions, including recent works by Cho and Lewis [2012], Kim [2012], Ertürk [2014], Long and Perumal [2014], Watty-Benjamin and Udechukwu [2014], as well as Long, Ajagbe and Kowang [2014] who concentrate on small and medium enterprises. Variables that refer to HR practices in employees training and development were taken into account in some of these studies. In human recourse

management, training is predicted to play an important role in increasing job satisfaction and organizational commitment. Employees who receive more training are more satisfied with their job, feel valued by their employer and are less likely to report turnover intentions.

In the case of the Polish market, very few publications address worker mobility. Jackson and Mach [2009] focus their analysis on the transition period (1988-1998) and show that women who work in state sector are less likely to move to private sector, and the willingness of Polish employees to change jobs declined in the 2006–2011 period [Sedlak&Sedlak, 2012]. This finding was partly supported by another survey conducted in 2013 by the Public Opinion Research Centre (CBOS). Results indicate that while 16% of employees intend to change their jobs in the near future, the actual number of Poles who changed the job at least once has decreased in the 2009–2013 period [CBOS, 2013]. Neither of these studies, however, considered how worker mobility is related to the risk of investments in human capital.

This paper attempts to contribute to the existing literature by investigating the mobility expectations of full-time employees and earnings risk associated with investments in human capital measured for different occupational cells.

Data and Empirical Strategy

We used data collected in the nationwide survey Bilans Kapitału Ludzkiego (Human Capital Balance). The project was coordinated by the Jagellonian University and Polish Agency for Entrepreneurship Development. In this paper we focused on 2012 data, because of detailed information about the levels and types of education, employment status, types of occupation, work experience, and job characteristics.

The initial sample consists of 17,600 individuals. For empirical purposes, we selected only full-time workers that have worked for their current employer for at least one year. These restrictions were imposed to obtain more objective findings, since there is empirical evidence that a greater history of job mobility leads to more voluntary job changes [Coppin, Vandenbrande, 2007]. All respondents who were self-employed, employed part-time, or unemployed were excluded. Additionally, we removed all individuals with missing observations on the variables which were used in the analysis. The final sample contains information about 3,557 individuals.

In comparison to other studies this sample is relatively small. For that reason, we used information about individuals' occupations according to the ISCO-88 (The International Standard Classification of Occupations). This type of classification includes ten 1-digit occupational categories, which excluded groups with small numbers of respondents. Since the group "Armed forces" is absent in the sample, nine occupational groups were obtained (see Table 1).

TABLE 1. Occupational groups

Occupational groups (ISCO-88)	Number of individuals	Percentage
Legislators, senior officials and managers	86	2.4
Professionals	583	16.4
Technicians and associate professionals	406	11.4
Clerks	299	8.4
Service workers and shop and market sales workers	604	17.0
Skilled agricultural and fishery workers	26	0.7
Craft and related trades workers	756	21.3
Plant and machine operators and assemblers	477	13.4
Elementary occupations	320	9.0
Total	3557	100.0

S o u r c e : own computations based on the Bilans Kapitału Ludzkiego data.

The data provide information on net monthly earnings. Individual wages were obtained by dividing monthly earnings by (1) the amount of hours spent at work every week and (2) by 4.33 (i.e., the average number of weeks in a month).

Table 2 contains descriptive statistics on variables used in a regression analysis. It also reports results of testing the differences between means in gender groups. From table 2 we see that women, on average, were more educated and earned less than men. Men were more likely to work as craft and related trades workers, whereas women were more likely to work as service workers and shop and market sales workers.

TABLE 2. Variables means and significance of the differences between gender groups based on t-tests

Variables	Gender	N	Mean	Standard Error Mean	Standard Deviation	Significance
Age	male	1847	40.15	0.268	11.510	0.002
	female	1711	41.31	0.249	10.308	
Years of education	male	1847	12.67	0.050	2.162	0.000
	female	1711	13.51	0.062	2.575	
Log wage	male	1847	2.4427	0.00997	0.42851	0.000
	female	1711	2.3123	0.01054	0.43594	
Legislators, senior officials and managers	male	1847	0.02	0.004	0.154	0.938
	female	1711	0.02	0.004	0.153	
Professionals	male	1847	0.10	0.007	0.294	0.000
	female	1711	0.24	0.010	0.426	

Variables	Gender	N	Mean	Standard Error Mean	Standard Deviation	Significance
Technicians and associate professionals	male	1847	0.09	0.007	0.290	0.000
	female	1711	0.14	0.008	0.344	
Clerks	male	1847	0.05	0.005	0.219	0.000
	female	1711	0.12	0.008	0.326	
Service workers and shop and market sales workers	male	1847	0.10	0.007	0.298	0.000
	female	1711	0.25	0.010	0.432	
Skilled agricultural and fishery workers	male	1847	0.01	0.002	0.090	0.552
	female	1711	0.01	0.002	0.080	
Craft and related trades workers	male	1847	0.34	0.011	0.474	0.000
	female	1711	0.07	0.006	0.263	
Plant and machine operators and assemblers	male	1847	0.22	0.010	0.417	0.000
	female	1711	0.04	0.005	0.190	
Elementary occupations	male	1847	0.07	0.006	0.250	0.000
	female	1711	0.11	0.008	0.319	

* Significance at the 5% level

Source: own computations based on the Bilans Kapitału Ludzkiego data.

To estimate the degree of expected mobility we used information about respondents' expectations of their career development in the next 12 months. In the questionnaire individuals could indicate whether they were likely to stay in the same position, move to an equivalent position, get a promotion or leave the organization. Based on Table 3, 8% of respondents in the data set expected career changes in the next 12 months. However, among respondents reporting expected mobility, more than 70% did not expect to leave the organization, but did intend to change to an equivalent, or higher, position. The results did not reveal any distinct differences in expectations between men and women.

TABLE 3. Expected career development in the next 12 months

Expected career development	Number	Percentage
Whole sample		
Stay on the same position	3274	92.0
Move to another equivalent position	99	2.8
Get a promotion	106	3.0
Leave the organization	78	2.2
Total	3557	100.0
Women		
Stay on the same position	1574	92.0

Expected career development	Number	Percentage
Move to another equivalent position	44	2.6
Get a promotion	54	3.1
Leave the organization	39	2.3
Total	1711	100.0
Men		
Stay on the same position	1700	92.1
Move to another equivalent position	55	3.0
Get a promotion	52	2.8
Leave the organization	39	2.1
Total	1846	100.0

Source: own computations based on the Bilans Kapitału Ludzkiego data.

To estimate earnings risk across occupational groups we used the approach typically applied in the literature [Berkhout et al., 2010; Hartog, Diaz Serrano, 2006; Hartog, Plug, Diaz Serrano, Vieira, 2003]. The risk is measured as a standard deviation of exponentials of residuals computed from an earnings regression.

First, a standard cross-section earnings regression was estimated. The following model was used:

$$\ln Y_{ij} = X_i\beta + \sum_j \alpha_j d_j + \varepsilon_{ij} \tag{1}$$

where *i* refers to individuals and *j* refers to occupational cells that he or she belongs to in the survey year. *Y* is an individual's wage; *X* is a matrix that contains such variables as completed years of education, age, age squared, and sex; d_j are dummy variables for types of occupations; α_j presents occupation dummy variables. To eliminate outliers we recorded the highest and the lowest 0.5% of log wages. Age was used instead of work experience because of its exogenous nature (see, for example [Berkhout et al., 2010; Diaz-Serrano et al., 2008]). The data provided information about individuals' work experience. Nevertheless, in this paper we follow the approach presented above to ensure the comparability of the results.

Earnings residuals were estimated as differences between observed and predicted log wages. Then risk was measured using the following equation:

$$R_j = \frac{1}{N_j}\sum_j (e_{ij} - \bar{e}_j)^2 \tag{2}$$

where R_j is risk in *j* occupational cell; e_{ij} is the exponential of the estimated residual for *i* respondent that belongs to *j* occupational cell; N_j is number of individuals in *j* occupational cell.

No distinction between specific and general human capital was made. Thus, for employees in the early stage of their career the estimated variance captures the risk of investments in education, while for more experienced workers this variance also includes the risk associated with investments in training (either general or specific).

Results

We started by estimating the equation (1). Results are summarized in Table 4. The coefficients are statistically significant and have the expected signs. Estimation results suggest that older workers tend to earn more. Education also leads to higher wages, which is in line with predictions of classic human capital theory.

TABLE 4. Estimation results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	1.380	0.101		13.721	0.000
Years of education	0.041	0.004	0.225	11.567	0.000
Age	0.021	0.005	0.529	4.506	0.000
Age squared	0.000	0.000	–0.434	–3.695	0.000
Gender	–0.203	0.015	–0.232	–13.899	0.000
Legislators, senior officials and managers	0.383	0.044	0.134	8.625	0.000
Professionals	0.303	0.026	0.257	11.509	0.000
Technicians and associate professionals	0.172	0.025	0.125	6.946	0.000
Clerks	0.059	0.027	0.037	2.160	0.031
Service workers and shop and market sales workers	–0.063	0.022	–0.054	–2.848	0.004
Skilled agricultural and fishery workers	–0.173	0.075	–0.034	–2.300	0.022
Plant and machine operators and assemblers	0.074	0.022	0.058	3.374	0.001
Elementary occupations	–0.082	0.026	–0.054	–3.163	0.002

* Significance at the 5% level

Source: own elaboration.

Next, using equation (2) we determined earnings risk of investments in human capital for nine occupational groups finding that occupational groups of the highest skills levels have the highest risk (see Table 5)[5].

TABLE 5. Earnings risk in occupational groups

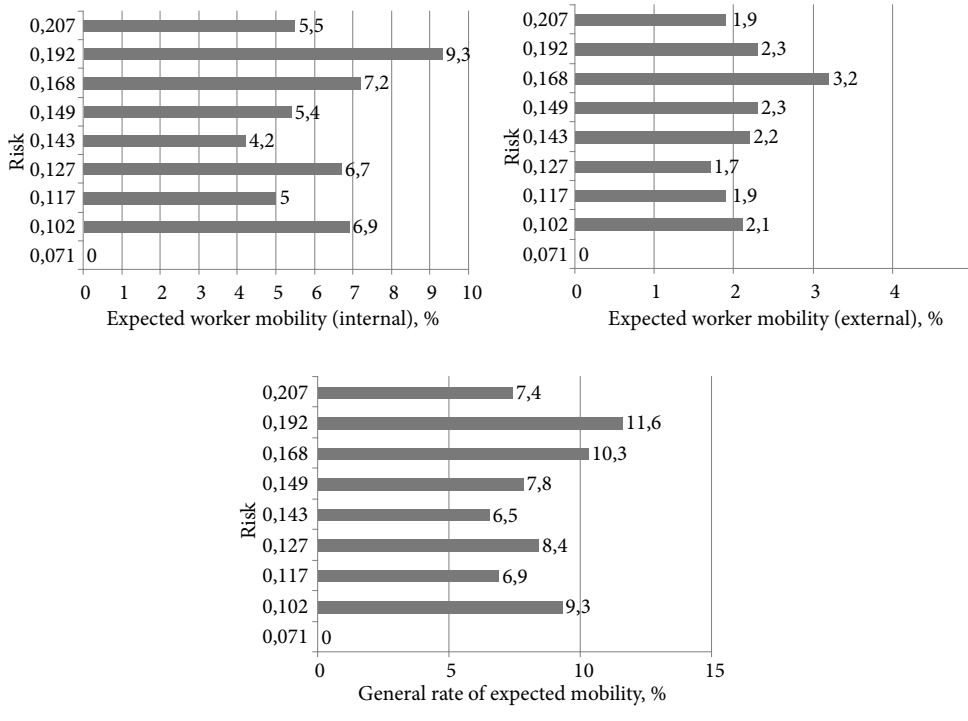
Occupational groups	Risk
Legislators, senior officials and managers	0.192
Professionals	0.207
Technicians and associate professionals	0.168
Clerks	0.127
Service workers and shop and market sales workers	0.102
Skilled agricultural and fishery workers	0.071
Craft and related trades workers	0.143
Plant and machine operators and assemblers	0.149
Elementary occupations	0.117

Source: own elaboration.

To answer the first research question, we related respondents' answers about their mobility expectations to the estimated value of risk for each occupational group. Additionally, two forms of mobility were considered, depending on whether the current organization is changed: internal and external. The former is associated with relocation of workers within the organization and the latter refers to moving to another organization [Pilar de Luis Carnicer, Martínez Sánchez, Pérez Pérez and José Vela Jiménez, 2003, pp. 200–201]. In our empirical analysis those individuals who expect to change their current position to equivalent or get a promotion were assumed to express expectations on internal mobility. Respondents who answered that they were going to leave the organization were assumed to have expectations on external mobility. Results appear in Figure 1.

The rate of external mobility varies from 0 for skilled agricultural and fishery workers to 3.2% for technicians and associate professionals. The rate of internal mobility varies from 0 for skilled agricultural and fishery workers to 9.3% for legislators, senior officials and managers (see Appendix 2 for more detailed information). As shown in Figure 1, occupational groups with different levels of risk do not vary greatly in their expectations about both internal and external mobility. Two occupational groups with the highest levels of earnings risk (technicians and associate professionals and legislators, senior officials and managers) also have the highest degrees of expected mobility. However, contrary to findings reported in the literature, there is a high degree of expected mobility in occupational groups with low earnings risk (e.g. service workers and shop and market sales workers). This is quite remarkable, since individuals who work in occupations with less risky earnings are believed to be less willing to take risk.

FIGURE 1. Expected workers' mobility and levels of risk



Source: own elaboration.

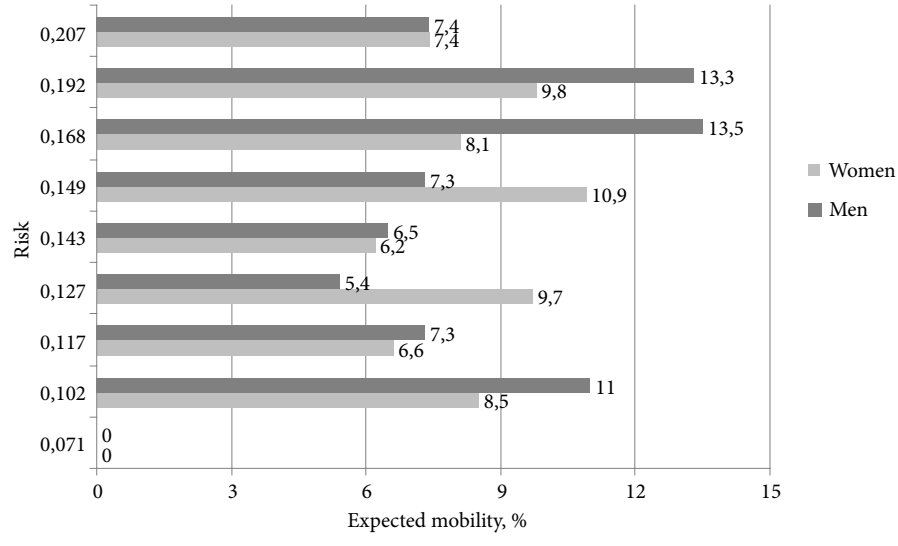
Results of cross-tabulation analysis confirm the notion that occupational groups do not differ in expected mobility, which means that there is no statistically significant relationship between workers' mobility expectations and occupational group (chi-square with eight degree of freedom = 11.201, p = 0.191). There is no association between occupational group and expected internal mobility (chi-square with eight degree of freedom = 10.814, p = 0.212). It was also found that occupational groups do not differ in expected external mobility (chi-square with eight degree of freedom = 3.345, p = 0.911).

The sample was then divided by gender and a cross-tabulation analysis was conducted separately for men and for women. Results indicate that occupational group and mobility expectations are independent both for female and male respondents. For chi-square tests, see Appendix 3.

Since women are commonly thought to be more risk averse [De Paola, 2013; Ding, Hartog, Sun, 2010; Hartog, Ferrer-i-Carbonell, Jonker, 2002], men can be expected to be more likely to anticipate mobility than women under the same level of risk. Figure 2 depicts mobility expectations for female and male respondents for each occupational group.

As follows from the Figure 2, in most occupational groups the level of expected mobility for men is greater than for women, except for two occupational groups in which the level of expected mobility for women is higher than for men. There is no difference in mobility expectations in two occupational groups: professionals and skilled agricultural and fishery workers, which have the highest and lowest risk, respectively.

FIGURE 2. Reported mobility expectations in gender groups

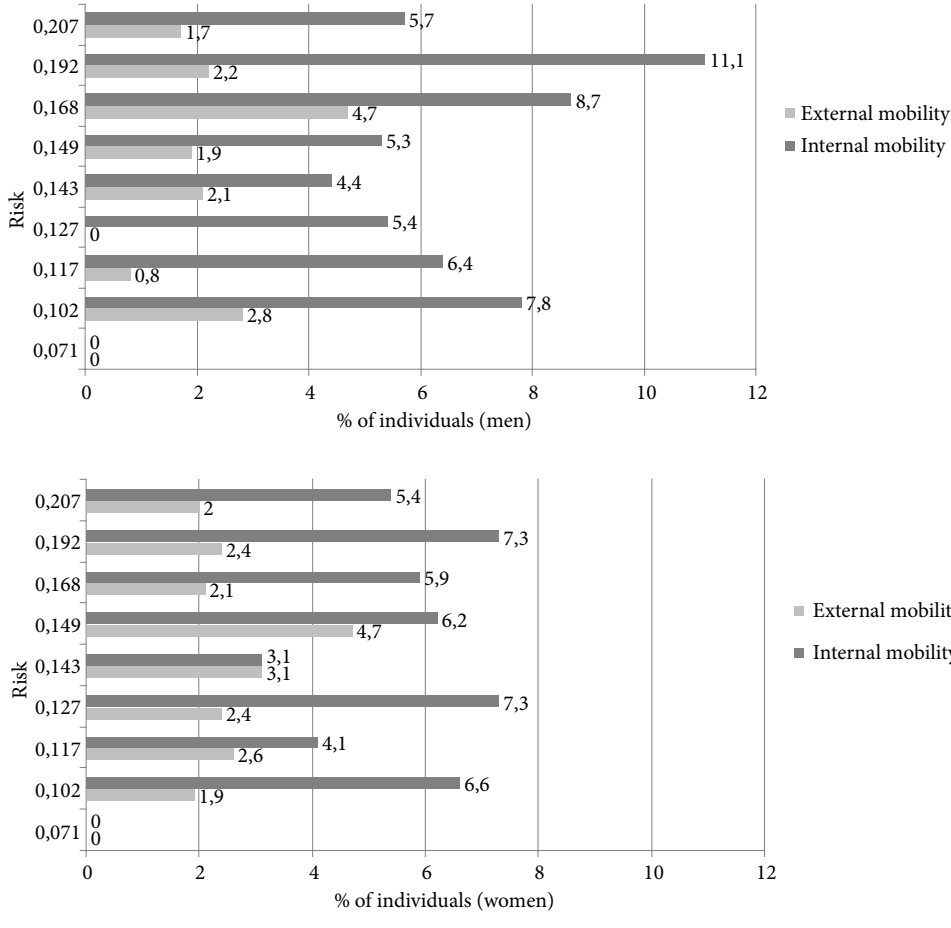


Source: own elaboration.

Leaving the organization can be perceived as a more risky situation than changing positions within the same organization. One possible explanations is that workers who participated in firm-specific trainings may have difficulties finding an organization where there they can use their specific human capital. Given the higher risk-aversion of females, it may be anticipated that higher earnings risk men are more likely to report expected external mobility than women. Surprisingly, male respondents did not report a greater degree of expected external mobility than females in riskier occupational groups (see Figure 3).

An independent samples t-test was conducted to examine whether there is a significant difference between men and women in their mobility expectations. The test revealed no statistically significant difference in all forms of expected mobility between female and male respondents. The only exceptional occupation category is clerks. Women reported significantly higher levels of expected external mobility than did men ($t = 9.667$, $df = 205.000$, $p = 0.025$). More detailed results are given in Appendix 4.

FIGURE 3. Expectations on external and internal mobility in gender groups



S o u r c e : own elaboration.

Conclusions

In this study, we focus on expected worker mobility under different levels of risk of investments in human capital, with a focus on differences in mobility expectations between female and male respondents.

The key contribution of the paper stems from its focus on the mobility expectations related to the earnings risk and its novel use of expected mobility instead of probability of

job changing. To the best of our knowledge, this is the first study of the risk of investment in human capital based on the Polish data.

Contrary to expectations, no clear relationship between risk and levels of expected mobility emerges, meaning that more risky occupational groups and less risky occupational groups do not score very differently on mobility expectations. For some occupations, we observe a greater level of expected mobility for men, while for others women report higher expected mobility. On the basis of the results, we conclude that earnings risk estimated for occupational groups has no effect on reported mobility expectation. Arguably, uncertainty about earnings is not the only risk which individuals face, there are other risks connected with occupational groups, which may impact workers' expected mobility (for example, unemployment risk, risk of lay-off). As they are not considered here further analysis of this issue is needed.

It is noteworthy, that the study considers a period following the recent economic recession. Although Poland was less affected than many other European countries by economic downturn, there were some negative consequences in the Polish labor market [Lewandowski, Magda, 2013]. Given the global economic crisis, it is possible that despite facing the risk of investments in human capital, employees did not expect voluntary job changes in the near future because of unfavourable conditions in the labor market and high unemployment limiting mobility. The relationship between the risk of investment in human capital and mobility expectations may be stronger during periods of economic growth when there are more labor opportunities [Ng, Sorensen, Eby, Feldman, 2007] and most job changes are expected to be voluntary.

Another possible explanation is that compared to other European countries, Poland shows relatively low level of job mobility and a high level of average tenure [Andersen, Haahr, Hansen, Holm-Pedersen, 2008]. The Polish labor market is also characterized by a high degree of employment protection. As pointed out by Kwiatkowski [2004], "… most people in Poland are wedded to the notion of their working careers taking place in one place and line of work" [as cited in Andersen et al., 2008, p. 120]. This could mean that mobility expectations also reflect employee perceptions of job importance unobserved by a researcher.

According to the CBOS [2013], over 30% of Poles were mobile in 2009–2013, while only 16% declared that they were expecting any job change. However, if offered a better paid job that did not match their skills, over 50% of respondents were ready to change jobs. Possibly, this lack of clear relationship between the risk of investment in human capital and mobile expectations reflects the fact that workers do not want to reveal information about their intentions.

The above results should be interpreted with particular caution for several reasons. The main research limitation is the small sample size, caused by the lack of observations of independent variables used in the analysis. As a result, to have a sufficient number of

individuals in each occupational group the sample was divided into nine groups according to The International Standard Classification of Occupations.

Following the literature, we assume that individuals with the same type of education can be employed in different occupations, but their mobility between occupational groups is rather limited [Nagl, 2012]. As stressed by Hartog and Diaz Serrano [2006, p. 355] a better approach would be to use educational cells, since occupational choice is not always strictly associated with education completed. Moreover, the type of education reflects investments in human capital more accurately. However, with the available data the number of respondents in each educational group would be too small.

In the analysis we assumed that reported mobility expectations refer to voluntary job changes and ignored the fact that employees may expect forced mobility. For this reason, more precise information on workers' mobility expectations should be used in future studies.

Despite the limitations mentioned above, this paper lays the groundwork for more comprehensive future research. Several questions remain: To what extent does the risk of investments in human capital explain workers' mobility expectations? and what is the role of other types of risk associated with investments in human capital, which may explain workers' job mobility? Evidently, more research is needed to develop a specific hypothesis and learn more about the relationship between the risk of investments in human capital and expected mobility. Such research would require more complex analysis and a larger data set.

Nevertheless, the finding of this research lead to several general policy and practical implications. The trend toward the accelerating pace of technological and demographical change in the labor market has caused concern among HR management practitioners. As evident from recent surveys, HR risk has been identified as one of the most common business risks, with the lack of key competences being regarded as the biggest threat for companies [Ernst&Young, 2008; Young, Hexter, 2011]. While employers are encouraged to invest in their employees, they should be aware of the risk associated with investments in training and how it could be related to turnover. Understanding this link may be helpful for implementing more effective HR policies and procedures. For example, employers can reduce the risk of investments in training by assuring that the expected training outcomes will be useful and relevant to an employee's current job and position in the labor market.

It has been argued that in an information-based society individuals should develop so-called "21st century skills", which include learning, literacy and social skills. At the same time, the operational program "Knowledge. Education. Development" emphasizes stimulating job mobility, which can improve workers' adaptability to a constantly changing labor market. This could be made possible by encouraging individuals to actively participate in different forms of education and training. The awareness of a relationship between the risk of investments in human capital and job mobility could help to develop national and local policies to address problems of educational activity. The issue presented in the paper is linked to the problem of predicting the future demand for skills. Thus, further

research on increasing the ability to achieve a balance between general and specific education programs and developing human capital that meets labor market demand is needed.

Notes

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[2] The previous version of the paper was presented on the 1st ESPAnet Poland Annual Conference "New horizons in social policy" (Poznań, 2014). I would like to thank two anonymous reviewers and Moon Jung Kim (Pennsylvania State University) for many valuable comments that have improved the quality of the paper. The financial support of the National Science Center (grant number UMO-2013/11/N/HS4/02969) is also gratefully acknowledged. All remaining errors are mine.

[3] Beginning with the paper of Levhari and Weiss [1974], there has been a growing literature on risk of investments in human capital. See, for example, Hartog and Diaz Serrano [2014] for the survey.

[4] The alternative concept introduced by Lazear [2003] suggests that all skills taken separately are general in the sense that they may be potentially used by all employers in the labour market. The author points out that for each employer some skills can be more valuable than others. Since different employers may use different combinations of skills, the employee should be interested in obtaining a variety of skills that are in demand by a greater number of employers. Matvos [2005] suggests that specific human capital can be divided into firm-specific and manager-specific human capital. The latter includes the effects of a long-term cooperation between the employee and his manager, such as trust, complementing abilities, as well as efficient teamwork and information sharing [Hayes, Oyer, Schaefer, 2006; Wu, 2007]. The author argues that investments in manager-specific human capital are undertaken by the employee. When the employee's supervisor leaves the company, the employee may lose manager-specific capital. This can contribute to decreased productivity and subsequent wage loss.

[5] These findings support the results reported for other countries (for example, for Spain by Hartog and Diaz-Serrano [2004]).

References

Andersen, T., Haahr, J.H., Hansen, M.E., Hlm-Pedersen, M. (2008), *Job Mobility in the European Union: Optimising its social and economic benefits (Final report for the European Commission, DG for Employment, Social Affairs and Equal Opportunities)*, Danish Technological Institute.

Becker, G.S. (1962), Investment in Human Capital: A Theoretical Analysis, *Journal of Political Economy*, Vol. 70, No. 5, pp. 9–49.

Berkhout, P., Hartog, J., Webbink, D. (2010), Compensation for Earnings Risk under Worker Heterogeneity, *Southern Economic Journal*, Vol. 76, No. 3, pp. 762–790.

Böckerman, P., Ilmakunnas, P. (2009), Job Disamenities, Job Satisfaction, Quit Intentions, and Actual Separations: Putting the Pieces Together, *Industrial Relations: A Journal of Economy and Society*, Vol. 48, No. 1, pp. 73–96.

Bonin, H., Dohmen, T., Falk, A., Huffman, D., Sunde, U. (2007), Cross-sectional earnings risk and occupational sorting: The role of risk attitudes, *Labour Economics*, Vol. 14, No. 6, pp. 926–937.

CBOS. (2013), *Mobilność i elastyczność zawodowa Polaków. Komunikat z badań (Mobility and Job Flexibility of Poles. Research statement)*, Centrum Badania Opinii Społecznej, Warszawa, http://www.cbos.pl/SPISKOM.POL/2013/K 011 13. PDF

Cho, Y.J., Lewis, G.B. (2012), Turnover Intention and Turnover Behavior: Implications for Retaining Federal Employees, *Review of Public Personnel Administration*, Vol. 32, No. 1, pp. 4–23.

Coppin, L., Vandenbrande, T. (2007), *Voluntary and forced job mobility in Europe*, HIVA, Catholic University of Leuven, Dublin.

De la Fuente, A., Ciccone, A. (2003), *Human capital in a global and knowledge-based economy*, Universitat Autònoma de Barcelona, Departament d'Economia i d'Història Econòmica, Unitat Fonaments de l'Anàlisi Econòmica.

De Paola, M. (2013), The Determinants of Risk Aversion: The Role of Intergenerational Transmission, *German Economic Review*, Vol. 14, No. 2, pp. 214–234.

Devereux, P.J. (2002), Occupational Upgrading and the Business Cycle, *Labour*, Vol. 16, No. 3, pp. 423–452.

Dex, S., Bukodi, E. (2013), Gender Differences in Job and Occupational Mobility in Varying Labor Market Conditions, *Working Paper*, No. 13–03. Department of Social Policy and Intervention, University of Oxford.

Diaz-Serrano, L., Hartog, J., Nielsen, H.S. (2008), Compensating Wage Differentials for Schooling Risk in Denmark, *Scandinavian Journal of Economics*, Vol. 110, No. 4, pp. 711–731.

Diaz Serrano, L., Hartog, J. (2007), Earnings risk and demand for higher education: a cross-section test for Spain, *Journal of Applied Economics*, Vol. X, No. 1, pp. 1–28.

Ding, X., Hartog, J., Sun, Y. (2010), Can we measure Individual Risk Attitudes in a Survey?, *IZA Discussion Paper*, No. 4807.

Ernst&Young. (2008), *Global human resources (HR) risk: from the danger zone to the value zone. Accelerating business improvement by navigating HR risk*, Ernst&Young, http://www.corporate-leaders.com/sitescene/custom/userfiles/file/2008_Global_Human_resource_risk.pdf

Ertürk, A. (2014), Influences of HR Practices, Social Exchange, and Trust on Turnover Intentions of Public IT Professionals, *Public Personnel Management*, Vol. 43, No. 1, pp. 140–175.

Gesthuizen, M. (2009), Job characteristics and voluntary mobility in The Netherlands: Differential education and gender patterns?, *International Journal of Manpower*, Vol. 30, No. 6, pp. 549–566.

Hartog, J. (2011), A Risk Augmented Mincer Earnings Equation? Taking Stock, in: S. Polachek and K. Tatsiramos (eds.), *Research in Labor Economics*, Emerald Group Publishing Limited, pp. 129–173.

Hartog, J., Diaz-Serrano, L. (2004), Is There a Risk-Return Trade-Off Across Occupations? Evidence from Spain, *IZA Discussion Paper*, No. 1355.

Hartog, J., Diaz Serrano, L. (2006), Is There a Risk-Return Trade-Off in Educational Choices? Evidence from Spain, *Investigaciones Económicas*, Vol. XXX, No. 2, pp. 353–380.

Hartog, J., Diaz Serrano, L. (2014), *Why do we ignore risk in schooling decisions?* Paper presented at the XXIII Meeting of the Economics of Education Association, Valencia.

Hartog, J., Ding, X., Liao, J. (2011), Is earnings uncertainty relevant for educational choice? An empirical analysis for China, *IZA Discussion Paper*, No. 5679.

Hartog, J., Ferrer-i-Carbonell, A., Jonker, N. (2002), Linking Measured Risk Aversion to Individual Characteristics, *Kyklos*, Vol. 55, No. 1, pp. 3–26.

Hartog, J., Plug, E., Diaz Serrano, L., Vieira, J. (2003), Risk compensation in wages – a replication, *Empirical Economics*, Vol. 28, No. 3, pp. 639–647.

Hayes, R.M., Oyer, P., Schaefer, S. (2006), Coworker complementarity and the stability of top-management teams, *Journal of Law, Economics, and Organization*, Vol. 22, No. 1, pp. 184–212.

Jackson, J.E., Mach, B.W. (2009), Job creation, job destruction, labour mobility and wages in Poland, 1988–1998, *Economics of Transition*, Vol. 17, No. 3, pp. 503–530.

Kim, S. (2012), The Impact of Human Resource Management on State Government IT Employee Turnover Intentions, *Public Personnel Management*, Vol. 41, No. 2, pp. 257–279.

Lazear, E.P. (2003), Firm-Specific Human Capital: A Skill-Weights Approach, *IZA Discussion Paper*, No. 183.

Levhari, D., Weiss, Y. (1974), The Effect of Risk on the Investment in Human Capital, *The American Economic Review*, Vol. 64, No. 6, pp. 950–963.

Lewandowski, P., Magda, I. (2013), *Employment in Poland 2012. Labour market during the recovery from the crisis*, Human Resources Development Centre, Warsaw.

Long, C.S., Ajagbe, M.A., Kowang, T.O. (2014), Addressing the Issues on Employees' Turnover Intention in the Perspective of HRM Practices in SME, *Procedia – Social and Behavioral Sciences*, Vol. 129, pp. 99–104.

Long, C.S., Perumal, P. (2014), Examining the Impact of Human Resource Management Practices on Employees' Turnover Intention, *International Journal of Business and Society*, Vol. 15, No. 1, pp. 111–126.

Matvos, G. (2005), Manager Specific Human Capital Investment: A Model of Block Trading and Firm Stability, *Unpublished Paper*.

McGoldrick, K., Robst, J. (1996), The effect of worker mobility on compensating wages for earnings risk, *Applied Economics*, Vol. 28, No. 2, pp. 221–232.

McGuinness, S., Wooden, M., Hahn, M.H. (2012), Job insecurity and future labour market outcomes, *Melbourne Institute Working Paper*, No. 12.

Nagl, W. (2012), Wage Compensations Due to Risk Aversion and Skewness Affection – German Evidence, *Ifo Working Paper*, No. 145.

Ng, T.W.H., Sorensen, K.L., Eby, L.T., Feldman. D.C. (2007), Determinants of job mobility: A theoretical integration and extension, *Journal of Occupational and Organizational Psychology*, Vol. 80, No. 3, pp. 363–386.

Pereira, P.T., Martins, P.S. (2002), Is there a return – risk link in education?, *Economics Letters*, Vol. 75, pp. 31–37.

Pilar de Luis Carnicer, M., Martínez Sánchez, A., Pérez Pérez, M., José Vela Jiménez, M. (2003), Gender differences of mobility analysis of job and work-family factors, *Women in Management Review*, Vol. 18, No. 4, pp. 199–219.

Raita, S. (2005), *The risk of investment in human capital*, PhD, Research Institute in Economics and Econometrics Amsterdam (RESAM), Amsterdam.

Sedlak&Sedlak. (2012), *Skłonność Polaków do zmiany pracy w latach 2006–2011 (The Propensity of Poles to Change Jobs in 2006–2011)*, Sedlak&Sedlak, Kraków.

Skriabikova, O.J., Argaw, B.A., Maier, M.F. (2013), Risk attitudes, job mobility and subsequent wage growth, *Working Paper*.

Sousa-Poza, A., Henneberger, F. (2004), Analyzing Job Mobility with Job Turnover Intentions: An International Comparative Study, *Journal of Economic Issues,* Vol. 38, No. 1, pp. 113–137.

Watty-Benjamin, W., Udechukwu, I. (2014), The Relationship Between HRM Practices and Turnover Intentions: A Study of Government and Employee Organizational Citizenship Behavior in the Virgin Islands, *Public Personnel Management*, Vol. 43, No. 1, pp. 58–82.

Wu, A. (2007), An analysis of employee investment in specific human capital based on game theory, *Journal of Contemporary Management Issues*, Vol. 12, No. 2, pp. 41–56.

Young, M.B., Hexter, E.S. (2011), *Managing Human Capital Risk. A Call for Partnership between Enterprise Risk Management and Human Resources*, The Conference Board, New York.

Appendices

Appendix 1

TABLE A1. Independent samples test for equality of variables means

	t-test for Equality of Means						
	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Age	–3.189	3551.965	0.001	–1.167	0.366	–1.884	–0.449
Years of education	–10.403	3349.453	0.000	–0.833	0.080	–0.989	–0.676
Log wage	8.992	3556	0.000	0.13038	0.01450	0.10195	0.15880
Legislators, senior officials and managers	0.078	3556	0.938	0.000	0.005	–0.010	0.011
Professionals	–11.538	3007.704	0.000	–0.143	0.012	–0.167	–0.118
Technicians and associate professionals	–4.178	3353.774	0.000	–0.045	0.011	–0.066	–0.024
Clerks	–7.474	2959.918	0.000	–0.070	0.009	–0.088	–0.052
Service workers and shop and market sales workers	–11.868	3011.131	0.000	–0.149	0.013	–0.173	–0.124
Skilled agricultural and fishery workers	0.592	3556	0.554	0.002	0.003	–0.004	0.007
Craft and related trades workers	20.834	2929.366	0.000	0.265	0.013	0.240	0.290
Plant and machine operators and assemblers	17.356	2623.201	0.000	0.186	0.011	0.165	0.207
Elementary occupations	–4.911	3242.823	0.000	–0.047	0.010	–0.066	–0.028

Source: own elaboration.

Appendix 2

TABLE A2A. Reported mobility by occupational groups

			Reported mobility		Total
			0.00	1.00	
Occupational groups	Legislators. senior officials and managers	Count	76	10	86
		Percentage	88.4%	11.6%	100.0%
	Professionals	Count	540	43	583
		Percentage	92.6%	7.4%	100.0%
	Technicians and associate professionals	Count	364	42	406
		Percentage	89.7%	10.3%	100.0%
	Clerks	Count	274	25	299
		Percentage	91.6%	8.4%	100.0%
	Service workers and shop and market sales workers	Count	549	55	604
		Percentage	90.9%	9.1%	100.0%
	Skilled agricultural and fishery workers	Count	26	0	26
		Percentage	100.0%	0.0%	100.0%
	Craft and related trades workers	Count	707	49	756
		Percentage	93.5%	6.5%	100.0%
	Plant and machine operators and assemblers	Count	440	37	477
		Percentage	92.2%	7.8%	100.0%
	Elementary occupations	Count	298	22	320
		Percentage	93.1%	6.9%	100.0%
Total		Count	3274	283	3557
		Percentage	92.0%	8.0%	100.0%

Source: own elaboration.

TABLE A2B. Chi-Square tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.201[a]	8	0.191
Likelihood Ratio	12.955	8	0.113
Linear-by-Linear Association	2.713	1	0.100
N of Valid Cases	3557		

[a] 1 cells (5.6%) have expected count less than 5. The minimum expected count is 2.07.

Source: own elaboration.

TABLE A2C. Reported internal mobility by occupational groups

			Reported internal mobility		Total
			0.00	1.00	
Occupational groups	Legislators. senior officials and managers	Count	78	8	86
		Percentage	90.7%	9.3%	100.0%
	Professionals	Count	551	32	583
		Percentage	94.5%	5.5%	100.0%
	Technicians and associate professionals	Count	377	29	406
		Percentage	92.9%	7.1%	100.0%
	Clerks	Count	279	20	299
		Percentage	93.3%	6.7%	100.0%
	Service workers and shop and market sales workers	Count	562	42	604
		Percentage	93.0%	7.0%	100.0%
	Skilled agricultural and fishery workers	Count	26	0	26
		Percentage	100.0%	0.0%	100.0%
	Craft and related trades workers	Count	724	32	756
		Percentage	95.8%	4.2%	100.0%
	Plant and machine operators and assemblers	Count	451	26	477
		Percentage	94.5%	5.5%	100.0%
	Elementary occupations	Count	304	16	320
		Percentage	95.0%	5.0%	100.0%
Total		Count	3352	205	3557
		Percentage	94.2%	5.8%	100.0%

Source: own elaboration.

TABLE A2d. Chi-Square tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.814[a]	8	0.212
Likelihood Ratio	12.138	8	0.145
Linear-by-Linear Association	3.225	1	0.073
N of Valid Cases	3557		

[a] 2 cells (11.1%) have expected count less than 5. The minimum expected count is 1.50.

Source: own elaboration.

TABLE A2E. Reported external mobility by occupational groups

			Reported external mobility		Total
			0.00	1.00	
Occupational groups	Legislators, senior officials and managers	Count	84	2	86
		Percentage	97.7%	2.3%	100.0%
	Professionals	Count	572	11	583
		Percentage	98.1%	1.9%	100.0%
	Technicians and associate professionals	Count	393	13	406
		Percentage	96.8%	3.2%	100.0%
	Clerks	Count	294	5	299
		Percentage	98.3%	1.7%	100.0%
	Service workers and shop and market sales workers	Count	591	13	604
		Percentage	97.8%	2.2%	100.0%
	Skilled agricultural and fishery workers	Count	26	0	26
		Percentage	100.0%	0.0%	100.0%
	Craft and related trades workers	Count	739	17	756
		Percentage	97.8%	2.2%	100.0%
	Plant and machine operators and assemblers	Count	466	11	477
		Percentage	97.7%	2.3%	100.0%
	Elementary occupations	Count	314	6	320
		Percentage	98.1%	1.9%	100.0%
Total		Count	3479	78	3557
		Percentage	97,8%	2.2%	100.0%

Source: own elaboration.

TABLE A2F. Chi-Square tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.345[a]	8	0.911
Likelihood Ratio	3.731	8	0.881
Linear-by-Linear Association	0.035	1	0.853
N of Valid Cases	3557		

[a] 2 cells (11.1%) have expected count less than 5. The minimum expected count is.57.

Source: own elaboration.

Appendix 3

TABLE A3A. Reported mobility (women) by occupational groups

			Reported mobility		Total
			0.00	1.00	
Occupational groups	Legislators, senior officials and managers	Count	37	4	41
		Percentage	90.2%	9.8%	100.0%
	Professionals	Count	377	30	407
		Percentage	92.6%	7.4%	100.0%
	Technicians and associate professionals	Count	216	19	235
		Percentage	91.9%	8.1%	100.0%
	Clerks	Count	186	20	206
		Percentage	90.3%	9.7%	100.0%
	Service workers and shop and market sales workers	Count	387	36	423
		Percentage	91.5%	8.5%	100.0%
	Skilled agricultural and fishery workers	Count	11	0	11
		Percentage	100.0%	0.0%	100.0%
	Craft and related trades workers	Count	120	8	128
		Percentage	93.8%	6.3%	100.0%
	Plant and machine operators and assemblers	Count	57	7	64
		Percentage	89.1%	10.9%	100.0%
	Elementary occupations	Count	183	13	196
		Percentage	93.4%	6.6%	100.0%
Total		Count	1574	137	1711
		Percentage	92,0%	8.0%	100.0%

Source: own elaboration.

TABLE A3B. Chi-Square tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.094[a]	8	0.849
Likelihood Ratio	4.917	8	0.766
Linear-by-Linear Association	0.132	1	0.717
N of Valid Cases	1711		

[a] 2 cells (11.1%) have expected count less than 5. The minimum expected count is.88.

Source: own elaboration.

TABLE A3C. Reported mobility (men) by occupational groups

			Reported mobility		Total
			0.00	1.00	
Occupational groups	Legislators, senior officials and managers	Count	39	6	45
		Percentage	86.7%	13.3%	100.0%
	Professionals	Count	163	13	176
		Percentage	92.6%	7.4%	100.0%
	Technicians and associate professionals	Count	148	23	171
		Percentage	86.5%	13.5%	100.0%
	Clerks	Count	88	5	93
		Percentage	94.6%	5.4%	100.0%
	Service workers and shop and market sales workers	Count	162	19	181
		Percentage	89.5%	10.5%	100.0%
	Skilled agricultural and fishery workers	Count	15	0	15
		Percentage	100.0%	0.0%	100.0%
	Craft and related trades workers	Count	587	41	628
		Percentage	93.5%	6.5%	100.0%
	Plant and machine operators and assemblers	Count	383	30	413
		Percentage	92.7%	7.3%	100.0%
	Elementary occupations	Count	115	9	124
		Percentage	92.7%	7.3%	100.0%
Total		Count	1700	146	1846
		Percentage	92,1%	7.9%	100.0%

Source: own elaboration.

TABLE A3D. Chi-Square tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.816[a]	8	0.063
Likelihood Ratio	14.619	8	0.067
Linear-by-Linear Association	4.141	1	0.042
N of Valid Cases	1846		

[a] 2 cells (11.1%) have expected count less than 5. The minimum expected count is 1.19.

Source: own elaboration.

Appendix 4

TABLE A4. Independent samples test for equality of means

Occupational group		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Legislators, senior officials and managers	Reported mobility	0.512	84	0.610	0.03577	0.06992	−0.10327	0.17481
	Reported internal mobility	0.599	84	0.551	0.03794	0.06332	−0.08797	0.16386
	Reported external mobility	−0.066	84	0.948	−0.00217	0.03292	−0.06764	0.06330
Professionals	Reported mobility	0.007	581	0.995	0.00015	0.02362	−0.04624	0.04655
	Reported internal mobility	0.134	581	0.893	0.00276	0.02058	−0.03766	0.04319
	Reported external mobility	−0.212	581	0.832	−0.00261	0.01230	−0.02676	0.02154
Technicians and associate professionals	Reported mobility	1.695	315.023	0.091	0.05365	0.03166	−0.00864	0.11594
	Reported internal mobility	1.056	325.697	0.292	0.02814	0.02665	−0.02428	0.08057
	Reported external mobility	1.361	281.381	0.175	0.02551	0.01874	−0.01139	0.06240
Clerks	Reported mobility	−1.384	228.092	0.168	−0.04332	0.03131	−0.10503	0.01838
	Reported internal mobility	−0.609	297	0.543	−0.01905	0.03130	−0.08064	0.04254
	Reported external mobility	−2.258	205.000	0.025	−0.02427	0.01075	−0.04546	−0.00308
Service workers and shop and market sales workers	Reported mobility	0.777	602	0.438	0.01987	0.02558	−0.03038	0.07011
	Reported internal mobility	0.493	602	0.622	0.01115	0.02263	−0.03328	0.05559
	Reported external mobility	0.675	602	0.500	0.00871	0.01291	−0.01663	0.03406
Craft and related trades workers	Reported mobility	0.117	754	0.907	0.00279	0.02391	−0.04415	0.04972
	Reported internal mobility	0.682	754	0.495	0.01334	0.01955	−0.02503	0.05171
	Reported external mobility	−0.733	754	0.464	−0.01055	0.01439	−0.03880	0.01770
Plant and machine operators and assemblers	Reported mobility	−0.888	76.897	0.377	−0.03674	0.04135	−0.11907	0.04560
	Reported internal mobility	−0.302	475	0.763	−0.00923	0.03056	−0.06928	0.05081
	Reported external mobility	−1.001	71.412	0.320	−0.02750	0.02748	−0.08230	0.02729
Elementary occupations	Reported mobility	0.215	318	0.830	0.00625	0.02912	−0.05104	0.06355
	Reported internal mobility	0.946	318	0.345	0.02370	0.02505	−0.02559	0.07299
	Reported external mobility	−1.257	314.816	0.210	−0.01745	0.01388	−0.04475	0.00985

Source: own elaboration.