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DETERMINANTS OF EARLY RETIREMENT TRANSITIONS OF TEACHERS IN POLAND. DOES REGIONAL HETEROGENEITY PLAY A ROLE?

This article contributes to the literature on early retirement transitions by testing a line of explanations of this phenomenon in a specific context of public sector employment. It utilizes waves 2006 and 2007 of a longitudinal data set of employment histories of Polish teachers (SIO). Standard structural explanations of early retirement transitions, i.e. labor force restructuring and devaluation of human capital of older workers do not find support in the data. Multilevel logistic regression models show instead that the considerable variance in early retirement risks found in the data can to some degree be explained by labour mobility of prime aged teachers, supporting the thesis of a labor market as generational figuration. The analyses identify two early emploment groups among Polish teachers: 49–54, and 55–59 year olds. Whereas retirement transitions in the younger group are to a greater extent attributable to individual pull factors (like work commitment), regional variation plays a greater role in the older "early retirees" group indicating higher risks of involuntary early retirement in this group.

Keywords: early retirement transition, public sector, Poland, teachers, System Informacji Oświatowej, figurational theory of labour market

INTRODUCTION

For at least the past two decades scholars have been showing substantial interest in transitions from work to retirement. This attention is in large part fuelled by concerns about the demographic ageing processes observed in most Western societies, albeit with differences in pace and scope (Kalache, Barreto and Keller 2005; United Nations 2013). In the course of demographic ageing the relationship between contributors to the pension system and pension claimants has been changing dramatically, making financing of pension systems more and more a burden for welfare state budgets (Gruber and Wise 2001; Roseveare, Leibfritz, Fore and Wurzel 1996). Moreover, it is believed that decreases in the number of people entering labour

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markets may lead to substantial labour shortages unless they are counterbalanced by higher labour market participation rates of older workers (Henkens, Remery and Schippers 2008). These realizations have eventually led to a reversal in labour market policies, moving away from supporting early retirement – which was once favoured for its (alleged: Sackmann 1998) contribution to solving the problem of slack labour markets and high youth unemployment in the 1980s and 90s, as well as for its role in accelerating intergenerational exchange in the face of rapid technological changes (Kohli, Rosenow and Wolf 1983) – towards extending the length of individual labour market participation and postponing transitions to retirement (OECD 2013).

Accordingly, there has been growing scientific interest in explaining the processes of labour market exit. Whereas socio-gerontological literature is concerned with individual level determinants of early exit like health (Rice, Lang, Henley and Melzer 2011), household situation (Loretto and Vickerstaff 2013) or attitudes (Jansen 2013) structural and institutional approaches tend to see early retirement as a result of structural pressures on the labour markets (Blossfeld, Buchholz and Hofäcker 2006; Buchholz, Rinklake, Schilling, Kurz et al. 2011; Diprete, Graaf, Luijkx, Tåhlin et al. 1997; Johnson and Zimmermann 1993; Kohli and Rein 1991) or as an effect of generous retirement policy (Blöndal and Scarpetta 1999; Börsch-Supan 2000; Hairault, Sopraseuth and Langot 2010). As yet, not much attention has been paid to regional and organizational contexts of transitions to retirement – other than those resulting from regionally/ organizationally unequal distribution of structural pressures (Buchholz 2008) – although there is a substantial body of research showing that both geographic location (Fassmann and Meusburger 1997) and workplace organization (Baron and Bielby 1980) have an impact on employment trajectories of individuals.

The article addresses these issues utilizing quantitative administrative data on teacher employment in Polish public schools while concentrating on factors driving early retirement. The employment structures in Polish public schools bear much resemblance to the ideal-typical model of internal labour markets, with major attention being given to employment stability and long-term work relations based on trust and commitment, although there are some weak signs of growing external flexibility (Kopycka 2013). According to the current state of research, in such a type of labour organization in the face of external downsizing pressures we would expect to find a heavier reliance on early retirement schemes than in cases of less institutionalized employment relations (Buchholz, Rinklake, Schilling, Kurz et al. 2011; Doeringer and Piore 1985; Lutz 1987; Sackmann and Bartl 2007). Indeed, early retirement schemes have been used extensively in Polish schools over approximately the last two decades as a reaction to the shrinking student population (Kopycka 2013). However, the individual-level data shows a considerable regional variance in the risk of early retirement, which only to a slight degree can be explained by regional disparities in demographically induced pressures to reduce the workforce. The analyses show instead that the major factors explaining the regional variety of early retirement risks are on the one hand the local economic situation and the level of mobility of the prime age employees on the other.

The article starts with a review of literature and theory on early retirement transitions, according to which hypotheses are formulated (section 2). In the next section a short description

of data and variables used is offered (section 3). The results of the conducted analyses are presented in section 4. Section 5 concludes the paper.

THEORETICAL CONSIDERATIONS AND HYPOTHESES

One of the most influential explanations of the prevalence of early retirement phenomena relates employment exit decisions to the shape of the pension system. This microeconomically informed view depicts the retirement decision as a rational choice between staying in employment and exiting the labour force made on the basis of differences in the subjective expected utility of both options. The assumption is that individuals prefer leisure to work, and the more generous their pension income is and the earlier pension benefits are available, the more frequent the incidence of early retirement will be. To the extent to which pension payments are not actuarially fair there exists an implicit tax on employment in the late career, which acts as a strong disincentive to work until the statutory retirement age (Blöndal and Scarpetta 1999; Duval 2003; Gruber and Wise 1998). Börsch-Supan (2000) shows in an international comparison of several European countries, Japan and the USA a striking resemblance between spikes in retirement transition occurrence along the late life course and kinks in the country-specific accrual function of pension wealth. In an econometric model based on German microdata he demonstrates the negative relationship between a retirement decision and an option value of staying employed and retiring at some other point in time, where the value of the option is a positive function of the difference between labour income and the level of the pension benefit at a given point in time. In much the same manner, in France Hairault, Sopraseuth and Langot (2010) recently found strong negative effects of reaching pre-retirement eligibility both on employment rates as well as on job search efforts in case of unemployment.

With regard to Polish teachers in the period under consideration (2006–2007) there was a generous early retirement scheme for this occupational group granting them the right to retire after having accumulated at least 30 qualifying years, 20 of which had to be spent actively teaching, irrespective of their age. The early retirement scheme had been introduced in the early 1980s as a part of a special labour law for teachers and other educational service occupations (see also Chlon, Góra and Rutkowski 1999; Kopycka 2013). Because one's time studying at university and other common employment breaks like family care, child bearing and unemployment count as qualifying periods, for many teachers it was possible to retire as early as age 49 (assuming here that one starts university studies at 19 with no more than 5 years of employment breaks during their career). This early retirement path was open until the end of 2008. However, teachers who acquired retirement rights by this date were able to retire early on the basis of this scheme in the following years as well. The early retirement path for teachers was also strongly actuarially unbalanced, as there were no reductions in benefits in case of an early transition to retirement. As the early retirement path for teachers did not contain any regional elements there is no reason to expect any regional variance in early retirement behaviour, should an early retirement

transition be a voluntary decision following the maximum utility rule. Hence, the first hypothesis states:

H1: Reaching the age of early retirement eligibility will increase the probability of exiting employment in the same manner across all municipalities.

According to Catherine Hakim's theory of work-family life preferences (2002), there is, however, an interpersonal variation in the responsiveness to institutional incentives with regard to individual labour market involvement. Hakim analyses lifestyle choices of women and postulates the existence of three distinct preference groups among them concerning their involvement in paid work. Work-centred women have a clear preference for employment or equivalent activities in the public sphere over family life. They are not responsive to family policy. Home-centred women on the other hand prefer not to work and are not responsive to labour market policy. The majority of women fall into the third, adaptive, type, which is characterised by the desire to combine both work and family life and for whom Hakim assumes a high responsiveness to both family as well as labour market policy. The idea of preference diversity concerning work-lifestyle choices can easily be applied to the field of retirement decisions. With the rise of early retirement options there has been a growing destandardisation of transition to retirement (Kohli 1994) enabling a diversity of individual preferences concerning the time of employment exit to come to the fore. Along these lines Vidovićová (2005) identifies three groups of elderly in the Czech Republic with regard to the level of activity in old age: active, adaptive and inactive, and assumes that among the inactive there will be the highest probability of early retirement. Soidre (2005) has applied preference theory to the question of retirement transition in Sweden. He finds that work attitudes exert a substantial effect on the desired retirement age. Persons with intrinsic work motivation were less inclined to retire early than persons working mainly for pecuniary reasons. Jansen (2013) shows in a multilevel logistic model that personal beliefs about the ideal retirement age significantly influence one's propensity to retire early, even after controlling for individual socioeconomic variance and for the influence of country-specific retirement transition cultures. It will be therefore assumed here that the individual propensity to early retirement will depend on the level of individual work commitment.

H2: With the growing individual work commitment of teachers the probability of early retirement transition decreases across all municipalities.

Not denying the influence of institutional early retirement incentives on individual withdrawal from the labour force, many scholars make a different argument: that various early retirement paths are merely a reaction of welfare state social policy to structural pressures on the labour markets which have arisen from economic developments since the early 1980s (Ebbinghaus 2006; Kohli and Rein 1991). Processes of globalisation and the emerging world economy have led to an increasing international division of labour in which low-skilled jobs are being relocated to countries with lower wage levels. In consequence the structure of national economies in the developed countries changes: old industries are shrinking while new high

specialised product and service sectors are emerging (Blossfeld, Buchholz and Hofäcker 2006). In the course of this process a need to relocate the labour force from shrinking to growing sectors arises (Diprete, Graaf, Luijkx, Tåhlin et al. 1997).

Furthermore, due to rising interconnectedness the level of economic uncertainty rises. Interdependent relations on the world market lead to the spread of economic turbulence and multiply the effects of random external shocks (Castells 1998). As a result, local firms and industries face higher levels of economic volatility. The accelerating social change also leads to changes in consumers' behaviour, necessitating a growing diversity of products and shortening of production cycles. Global competition and diffusion of knowledge utilising new information and communication techniques result in a higher pace of technological innovation (Blossfeld, Buchholz and Hofäcker 2006) necessitating rapid adaptation of the organisation of production to new technological developments (Kohli and Rein 1991). Higher uncertainty levels, short planning and production cycles, high speed of technological change and growing international competition on the world product markets make the dominant structure of labour relations in the form of big internal labour markets obsolete and demand a new social organization of work allowing for higher flexibility in the use of labour as a factor of production (e.g. subcontracting, fixed-term employment). As a consequence of this restructuring process the problem of an excess core workforce appears.

How these two structural problems (the relocation of workforce from shrinking sectors to growing ones and the reduction in the number of core employees) are met, however, depends on the shape of national institutional regimes, which define interdependent relations among various groups of workers and therefore structural risks and opportunities at the individual level. Firstly, the level of occupational segmentation determines the costs of occupational mobility. Systems with comparatively weakly developed occupational training structures display higher levels of inter-occupational mobility, and changing occupations also results to a lesser extent in downward mobility in terms of pay (Büchtemann, Schupp and Soloff 1993). In highly developed occupational training systems, in contrast, the occupational mobility is constricted by stiff occupational boundaries constituted by an elaborated system of occupational titles (Marsden 1999; Maurice, Sellier and Silvestre 1986). Such segmentation reduces transaction costs and is generally supportive to inter-firm mobility (Struck 2006) and facilitates transitions from education to employment (Allmendinger 1989; Gangl 2001; Müller and Gangl 2003; Scherer 2001; 2005). Nevertheless, the effective blockage of occupational mobility leads to situations in which changes in the qualification structure of the labour force rely mainly on intergenerational exchange, slowing down the adjustment process of the occupational structure to a new distribution of labour demand (Blossfeld and Stockmann 1998/1999). In the face of such occupational barriers there is a strong incentive to use early retirement schemes, as they serve as an accelerator of the intergenerational occupational restructuring (Diprete, Graaf, Luijkx, Tåhlin et al. 1997).

Secondly, the institutional shape of labour relations and the level of social security benefits both influence the way labour market risks are distributed among the labour force. Along the lines of the widely cited "Varieties of Capitalism" approach by Hall and Soskice (2001) two

ideal types of industrial relations can be differentiated. In liberal market economies the level of employment protection regulation is rudimentary, employee representation is weak and employment stability depends to a greater extent on the individual work-related resources of the worker (e.g. the level of human and social capital). In coordinated market economies the level of protection against dismissal is high, employment relations are initiated with a perspective on longer duration and employee representation bodies play an important role in shaping personnel management strategies of the companies. Whereas the low level of employment protection in liberal market economies leads to a distribution of unemployment risks according to the level of individual labour market resources, the high level of employment protection in coordinated market economies produces systems of closed positions (Sørensen 1983), in which exit mobility until the mandatory retirement age occurs solely voluntarily. Protection against dismissal, which favours certain groups of workers against others, leads labour market risks to concentrate on particular groups of workers, namely entrants and outsiders (Lindbeck and Snower 1988). Moreover, in the face of restructuring and/or downsizing pressures such structures tend to bring about high numbers of early retirement transitions, because early retirement is seen as the most socially acceptable way to shed excess personnel (Blossfeld, Buchholz and Hofäcker 2006; Casey, Metcalf and Millward 1997; Kohli, Rosenow and Wolf 1983).

Putting issues of employment protection aside, Hutchens (1999) shows that generous social security benefits may lead to enhanced early retirement transitions a reaction to demand shocks. In the course of falling demand for a company's products the productivity of its workers falls. In such a situation early retirement schemes may work as a social security benefit subsidizing employment reductions, so that dismissals concentrate disproportionately on elderly workers (Dorn and Sousa-Poza 2008).

Similar structural pressures like sectorial change and demand shocks necessitating workforce reductions can be traced in developments within the Polish educational sector. Firstly, in the course of transformation and education reforms of the late 1990's and after the 2000 the national school curriculum changed (Sackmann, Bartl, Jonda, Kopycka et al. 2015). Directly following the abrupt change in 1989, the main foreign language taught in schools, Russian, was replaced by Western European languages, primarily English and German. At that time religion was also re-established as a school subject (Hörner and Wompel 1994). Information technology has replaced domestic and technical courses and subject-specific courses have been rearranged into comprehensive forms of teaching. Music and drawing have been replaced by "arts", and biology, physics and chemistry have been combined into "science". At the same time qualification requirements concerning teachers have been increasingly strict (Kopycka 2013). In sharp contrast to Germany, for example, there is a strong subject specialisation of teachers. As a rule, teachers in Poland upon graduation have the right to teach only one subject. In order to be able to teach any other subject, even a related one, they need to finish postgraduate studies, taking as a rule three or four semesters. The Polish teacher labour market is, hence, strongly segmented along subject lines. Under such conditions the change in curriculum, leading to discrepancies between the qualificational structure of the

workforce and new qualification demand structure may result in high rates of involuntary early retirement as a way to accelerate an intergenerational exchange of qualification profile of the workforce.

H3: Being qualified to teach "contracting" subjects will increase the risk of early retirement across all municipalities.

Secondly, since the early 2000s Polish schools have witnessed a fall in student numbers as a consequence of a low fertility trend in in the late 1980s (Kotowska 2002). There are regional variations of this process, however (Rządowa Rada Ludnościowa 2004). Shrinking student population translates into a demand shock which puts pressure on public schools to reduce personnel. At the same time Polish teachers enjoy high levels of employment protection (Kopycka 2013). Under such circumstances personnel reduction is achieved mainly via early retirement schemes (Buchholz, Rinklake, Schilling, Kurz et al. 2011).

H4: The risk of early retirement will be greater for teachers employed in municipalities with falling student numbers.

Since as early as 1980, however, the seminal analysis of mobility processes conducted by Baron and Bielby (1980) has convincingly shown that explanations focussing on macro-structural effects alone may be, under certain circumstances, incomplete. It is, therefore, at the level of organization that individual social mobility is decisively shaped, and what can be observed at the sectorial or national level is merely an aggregation of these processes. Organizations differ with respect to their personnel policies and in this way create different environments for returns on human capital (Hendry 2003; Lepak, Liao, Chung and Harden 2006; Struck and Dütsch 2012). In the same manner and more recently Baron et al. (2007) were able to conclude that chances for career advancement of women are closely related to the level of bureaucratisation of personnel decision-making adopted in a given organisation. Similarly, Dütsch and Struck (2014) have found substantial firm-level effects on the risk of unemployment in phases of economic downturn and on the chances of upward mobility while changing firms. Also research on organizational demography highlights the importance of firm-level analysis. In accordance with this line of argumentation, career prospects are related to internal organizational structure, understood as a system of positions on different hierarchical levels, as well as to the demographic structure of a firm's employees (Stewman and Konda 1983). Furthermore, organizational dynamics have a decisive influence on employees' careers, as prospects of advancement are higher in growing than in shrinking organizations.

With respect to retirement transitions there has not been much interest in organisational factors as yet, although Buchholz (2008) has found substantial effects of organizational size on the risk of early retirement in Germany. Big firms tend to rely more on early retirement schemes in their personnel policies than do small ones. Analogously, Bellman and Janik (2010) confirm the risk-increasing effect of big firms on early retirement transitions and also find a minor positive correlation between the use of early retirement and the presence of workers' representation (*Betriebsrat*) in a firm.

Among other features, firms also differ in the way they react to market turbulence and in this way may have a strong mediating effect on the relation between structurally induced demand shocks and employment prospects of employees. According to Boyne (2006), in the face of falling performance organizations may adopt any of three (not mutually exclusive) strategies: retrenchment, which is aimed at cutting unprofitable branches of activity; repositioning, which is instead focused on gaining new markets and expanding into new fields of activity or new markets; and lastly reorganization, involving changes to the internal structure of an organisation allowing for a reorientation in human resource management, in control and communication schemes and the like. Reorganisation may also facilitate the implementation of the other two strategies. It is intuitive that the adoption of any of these strategies will have varying consequences for the employees. A retrenchment reaction to a demand shock will generate excessive pressure to reduce personnel, whereas in the course of repositioning current employment levels may be maintained and personnel reduction mostly avoided.

With regard to the Polish school sector there is a wealth of evidence on different expansion strategies that are being adopted in the face of demographic decline (Kopycka 2008; 2013; Sackmann, Bartl, Jonda, Kopycka et al. 2015). Their scope, however, varies across municipalities. Hence, the level of educational investment in a given municipality can be considered a manifestation of their different reactions to a demographically induced demand shock: either the strategy of retrenchment or the repositioning strategy, leading potentially to different consequences for teacher early retirement transitions.

H5: In municipalities where educational expenses per student are high, teachers face less risk of early retirement.

Eventually, research indicates substantial effects of regional context on employment careers. In this respect Windzio (2004) analyses the influence of regional unemployment rates on individual spatial job mobility and finds a negative relation between the two. Grotheer, Struck, Bellmann et al. (2004) find different effects of regional unemployment rates on job mobility in West and East Germany. While in the west this impact is positive, in the east higher rates of unemployment promote higher levels of job stability. Clark (1998) shows for US regions a substantial variance in labour fluctuation rates, which cannot be attributed to a region-specific industry mix. Fassmann and Meusburger (1997) argue that core regions offer better employment and career advancement chances than peripheral ones because primary labour markets tend to develop in more densely populated regions. With respect to early retirement transitions in Germany, Becker and Brussig (2009) find strong effects of regional economic indicators on the propensity of early retirement. Both the economic growth rate and the rate of employment growth decrease the risk of early exit from work, although the authors do not specify mechanisms driving this regularity. It therefore remains open, whether higher levels of labour activity of the elderly are driven by their higher job stability or, to the contrary, by better re-employment chances in economic growth regions.

Yet another way of thinking about regional effects in the late career stage is in terms of spatial and occupational segmentation of the labour market. Theories of migration and life course theories assume that spatial mobility decreases with age (Wagner 1990). According

to human capital theory (Becker 1962) one would also expect falling rates of reskilling with growing age, as the time left to make returns on investments in training decreases (Ehler 2010). In line with the figuration theory of the labour market (Sackmann 1998) individual employment opportunities have to be regarded in terms of institutionally shaped interdependencies between groups of workers. In systems with no institutionalized employment protection the structural interdependency between groups of workers lies solely in the structural differences in human capital. In systems with institutionalized employment protection, however, dismissal costs enter the equation and differentiate relative costs of a layoff according to different protection levels of employee categories. It can, therefore, be expected, that in a labour market with high employment protection legislation (additionally enhanced by normative expectations embodied in the figure of a "good employer") and with falling labour demand the employment prospects of elderly insiders, who can potentially be displaced via early retirement schemes, will depend on voluntary mobility of prime-age insiders. This, in turn, may be facilitated by economic and employment growth.

H6: In municipalities with higher exit mobility of prime age teachers the risk of early retirement decreases.

H7: In municipalities with a better economic situation teachers face lesser early retirement risks.

DATA AND METHODS

The analyses are made with the SIO dataset, a unique administrative dataset comprising employment information on all teachers currently employed in Polish schools. The dataset is administrated by the Polish Ministry of Education (http://sio.men.gov.pl/) (Kopycka 2013). The information is gathered twice a year (in autumn and in spring) from schools, which are compelled to fill in an online questionnaire on a range of topics concerning the school. Among others, detailed individual-level information on teachers currently employed in schools is also provided. As each teacher receives a unique identifier the data can be transformed into a panel dataset, which makes it possible to track teachers' employment careers as long as they stay employed in education. The dataset covers the years from 2005 on and is updated on a yearly basis. The subsample used for analyses in this article is constrained to teachers teaching in public schools and the available information covers two observation points: the years 2006 and 2007. In order to assess the influence of municipality-specific factors, the dataset is supplemented by statistical information on municipalities provided by the Polish central statistical office in its local databank BDL (available to download under http://stat.gov.pl/bdl/app/strona.html?p_name=indeks).

The hypotheses are tested using logistic regression and multilevel logistic regression models. Additionally, descriptive statistics for variables of interest are provided.

Due to data limitations it is not possible to observe early retirement transitions directly (the information is not available in the data). I therefore model exit from employment in schools instead, and assume that exits after reaching pre-retirement eligibility are in fact early retirement

transitions. Because the dataset does not include information on employment outside the public school sector, it cannot be excluded that some of the older teachers exiting schools take up employment in other occupations. The high occupational segmentation as well as advanced age of these individuals makes such transitions to other occupational fields rather improbable, although this does not preclude working (in other areas) while in retirement. Teacher retirees who are still actively teaching cannot, on the other hand, be identified in the dataset, as the information on retirement status is not included. The operationalization of early retirement by means of exit from employment from schools has, therefore, some limitations, although the number of false positives and false negatives should not be very high.

With regard to independent variables used in the models the following indicators have been applied. Early retirement eligibility is operationalised as reaching a certain age. Two age ranges are specified: from 49 to 54, which marks a very early transition, and from 55 till 59, which marks an early transition. Retirement transitions between the age 60 and 65 are treated as normal retirement age, as according to the Polish legislation (at the time the data is referring to) the retirement age for women was 60. As an indicator of work commitment the information on occupational advancement is applied. In the Polish teacher career path there are four promotion levels. Whereas at reaching the third level teachers acquire extra employment security, the fourth level guarantees them "only" an increase in salary. As the procedure of promotion requires additional effort, I assume that only those committed to the teaching profession will reach the highest promotion level.

With regard to subject specialisation of a teacher I differentiate "contracting" and "growing" subjects from the rest. I locate contracting subjects in instruction areas where an interdisciplinary approach has been introduced, requiring a new qualification profile of the teachers. It applies to music and drawing (which have been replaced by arts) as well as to chemistry, physics, geography and biology (which have been combined into science at the primary school level). Additionally I regard technical and domestic science as a contracting subject as it loses some of its importance in favour of information science. Moreover, growing subjects can be identified. These are especially Western foreign languages, information science and physical education. As for demographically induced demand shocks, I operationalise them in terms of a percentual change in the number of children in school age living in a given municipality. Municipal spending on education is operationalised as the amount spent yearly per student in a given municipality. As far as the local economic situation is concerned I use two indicators: the unemployment rate, which is available for the administrational level of *powiat* (a *powiat* is comprised of approximately ten municipalities and is the second level of local administration); and GDP per capita, which is available at the sub-voivodeship level (*podregion*).

RESULTS

Looking at the age distribution chart of teachers employed in 2006 in Polish public schools it is apparent that the number of employees decreases rapidly starting approximately at the time of early retirement eligibility (age 49, marked with a red line – see Fig. 1).

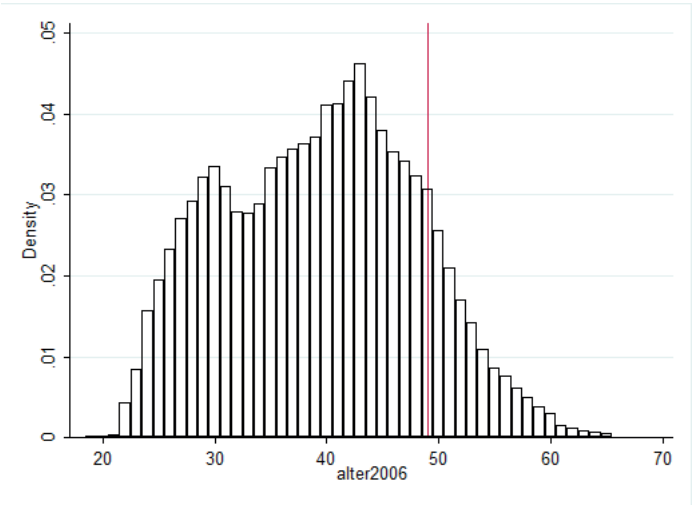

Figure 1. Age distribution of teachers employed in Polish public schools in 2006

The results of the random intercept multilevel logistic regression model (Tab. 1) corroborate this descriptive result. Indeed, being between 49 and 54 years old, a teacher faces an almost ten-times greater risk of exiting employment than a teacher in the prime age group. The relative risk also increases considerably for those between 55 and 59, as they face an almost 14 times higher risk of exit. The risk of employment exit then slightly declines for the group of 60 to 65 year olds. There is indeed, however, only a small number of teachers who reach this age in employment. The results are so far in line with the eligibility hypothesis (H1).

Table 1. Probability of exiting employment in Polish public schools by age and other factors across municipalities. Random intercept logistic regression, odds ratios

	Model 1
Age <27	1.39
Age 27–48	Reference
Age 49–54	9.67
Age 55–59	13.73
Age 60–65	12.98
Female	0.91
High work commitment (4th promotion level)	0.51
2nd promotion level and below	1.82
Fixed term employment	2.52

Table 1 cont.

Lower university degree	1.29
Teachers' vocational training	1.81
Lower educational level	2.84
Intercept	0.02
Intercept variance	0.08
N	312524
N municipalities	2224
Log-Likelihood	–61638.21
AIC	123302.4

All coefficients are significant at $p < 0.001$ level

In order to assess the stability of these effects across municipalities I estimate random intercept regression models separately for age groups (see Tab. 4). The results with regard to the between-municipality variance of exit probability for different age groups are summarised in Table 2.

Table 2. Inter-municipality variance of exit probability by age

Age	**Results**
27–48	0.077
49–54	0.215
55–59	0.195
60–65	0.119

We see a substantial variance at the local level in the influence of age effects on exit rates. Furthermore, the level of variance depends on age. We see clearly that the place of employment influences the rate of employment exit above all in the 49 to 54 year-old group and second of all in the group of 55 to 59 year-old teachers, whereas the municipal level variance of exit probability in other age groups is considerably lower. With regard to retirement transitions it can therefore be concluded that being 60 to 65 years old increases the risk of retirement more or less in the same manner across all municipalities. This age range can therefore be considered as an age of voluntary (employee induced) retirement transitions. In contrast, higher municipality-level variance of transition risks in the two younger age groups suggests that these transitions are at least in some part involuntary. Early retirement transitions are therefore influenced by municipality-level factors, which speaks against the eligibility hypothesis (H1).

In order to assess the influence of work commitment and subject of instruction on the probability of early retirement transition (hypotheses 2 and 3) I estimate logistic and multilevel logistic regression models for the group of older teachers. As an indicator for work commitment I use the achieved level of career advancement. Older teachers concentrate predominantly on the two highest promotion levels. Almost 55% of teachers aged 49 to 65 reach the third promotion level and almost 41% are on the fourth and highest level. Accordingly, less than 5% of older teachers have achieved only up to the second stage of professional development. Reaching the highest promotion level seems therefore to be a well-differentiating feature, as the teacher population is roughly divided into halves. With regard to qualification profiles that become "obsolete" in the course of curricular changes I pinpoint a few subjects in which the instruction time has been cut. These subjects include biology, chemistry, physics, geography and domestic and technical science. In the group of teachers aged 49 to 65 there are approximately 12% qualified in contracting subjects. Because I am interested in age specific effects, I estimate interaction effects of work commitment and subject of instruction with age. The results of the models are given in Table 3.

Table 3. Probability of older teachers to exit employment in Polish public schools by age, work commitment and subject of instruction across municipalities. Logistic regression and random intercept logistic regression

	Model 2	**Model 3**	**Model 4**	**Model 5**
Age 49–54	−0.42***	−0.50***	−0.73***	−0.83***
Age 55–59	−0.06	−0.09	−0.20***	−0.26***
Age 60–65	Reference			
High work commitment (4th promotion level)	−0.16	−0.19*		
Up to 2nd promotion level	−0.26***	−0.26***		
3rd promotion level	Reference			
High work commitment * age 49–54	−0.62***	−0.72***		
High work commitment * age 55–59	−0.37***	−0.42***		
Teaching a contracting subject			−0.09	−0.06
Teaching a contracting subject * age 49–54			−0.04	−0.07
Teaching a contracting subject * age 55–59			−0.12	−0.14
Sex (female)			0.22***	0.28***
Intercept	−0.65***	−0.58***	−0.83***	−0.78***
Intercept variance		0.14		

Table 3 cont.

	Model 2	**Model 3**	**Model 4**	**Model 5**
Random effect variance: high work commitment * age 49–54		0.06		
Random effect variance: high work commitment * age 55–59		0.07		
Covariance of random effects: high work commitment * age 49–54, high work commitment * age 55–59		0.01		
Covariance of intercept and random effect: high work commitment * age 49–54		0.06		
Covariance of intercept and random effect: high work commitment * age 55–59		0.06		
N	45966	45966	45966	45966
N municipalities	2469	2469	2469	2469
Log likelihood	–24099.489	–23867.795	–24484.353	–24282.651
AIC	48212.98	47761.59	48982.71	48581.3

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

According to the hypothesis of work attitude-related early retirement (H2) I expect, firstly, to find effects of work commitment on the probability of exit in the two "early retirement" groups (aged 49 to 54 and 54 to 59) and no effects of work commitment in the group retiring at the "normal" retirement age between 60 and 65. In line with the expectations, the results reveal a substantial and significant effect of work commitment in both younger age groups, whereas the effect of higher work commitment in the oldest group of teachers is insignificant at the 5% level (Model 2). Moreover, the risk of exiting employment for teachers aged 55 to 59 who do not display high work commitment is not significantly lower than the risk of the oldest group. Therefore, being 55 to 59 years old decreases the probability of exit only for the highly committed teachers.

In the second step I estimate a multilevel logistic regression model in order to prove whether the effect of work commitment is also stable across municipalities (Model 3). The overall inter-municipality variance of log mean risk of exit in the following year in the group of teachers aged 49 to 65 is significant and amounts to 0.14. If we consider the effect of work commitment separately for the two "early retirement" age groups it shows, however, that its inter-municipality variance is higher than the mean variance (positive covariance), indicating that the effect of work commitment in these age groups is more dependent on the employing municipality than it is the case in the oldest group. It seems, therefore, that on the one hand persons with high work commitment have indeed a stronger motivation to

avoid early retirement, but on the other hand they are in some ways restricted in their choices by municipal-level factors. Figure 2 shows box plots of estimated overall effects of work commitment in both "early retirement" age groups for each municipality.

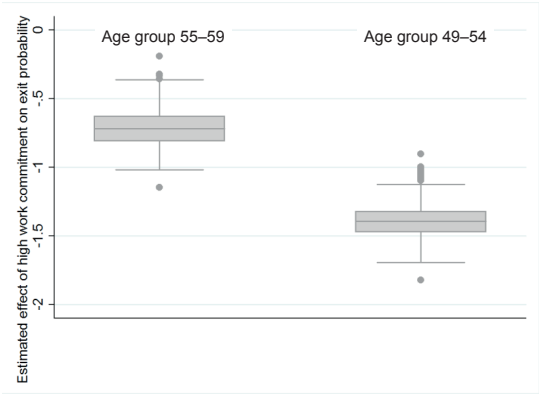

Figure 2. Estimated effects of work commitment on exit probability among 49–54 and 55–59-year-old teachers. Box plots

Indeed, high work commitment decreases the risk of early retirement in every municipality (entire box plots are below the zero line) and this result is therefore supportive of the second hypothesis. At the same time, the magnitude of this decrease shows substantial variance. We see that the effect of work commitment is stronger and also shows less variance in the younger group, whereas in the group of 55 to 59-year-old teachers it is less pronounced and varies more notably between municipalities.

Turning to the issue of teacher qualification profiles and their influence on early retirement probability I expect to find a significant positive effect of teaching a "contracting" subject on exit probability in the two "early retirement" groups (H3). It is often argued that early retirement transitions result from the fact that human capital of older employees has lost its value in the course of rapid technological change. An abrupt change in school curricula should result in similar demand shocks on certain qualification profiles, leading to excessive early retirement transitions of those trained in subjects which have been reduced in scope. Against this expectation the results of logistic regression models (M4) show that the mean effect of teaching a contracting subject on the risk of retirement across all age groups of older teachers is not significant. Also with regard to particular age groups no significant effects could be observed. Controlling for municipality-level variance in the random intercept model (M5) has not altered these results. We see no significant effects of subject of instruction. The third hypothesis must, therefore, be rejected.

In order to prove hypotheses 4 to 7 I estimate a range of multilevel logistic regression models for each age group separately, controlling for various municipality-level factors. The model estimates are summarized in Table 4.

Table 4. Probability of older teachers to exit employment in Polish public schools by age and municipality-level factors across municipalities. Random slope logistic regression

Specification	27–48				49–54			
	Model 6a	**Model 6b**	**Model 6c**	**Model 6d**	**Model 7a**	**Model 7b**	**Model 7c**	**Model 7d**
Increase in student numbers in %		−0.001	−0.003*	−0.003*		–0.008***	–0.009***	–0.009***
Educational expenses per student			0*	0*			0	0
Local GDP *per capita* (in % of national mean)				0				−0.003**
Local unemployment rate				0				0.003
Intercept	−3.53	−3.57	−3.74	−3.76	−1.56	−1.76	−1.76	−1.61
Intercept variance	0.077	0.075	0.072	0.071	0.215	0.194	0.190	0.180
N	241774	241774	241594	241594	36764	36764	36740	36740
N municipalities	2224	2224	2222	2222	2213	2213	2211	2211
Log-likelihood	–28913.15	–28911.9	–28877.85	–28877.73	–16504.6	–16489.77	–16480.78	
AIC	57844.3	57843.79	57777.7	57781.45	33027.2	32999.53	32983.56	

Specification	55–59				60–65			
	Model 8a	**Model 8b**	**Model 8c**	**Model 8d**	**Model 9a**	**Model 9b**	**Model 9c**	**Model 9d**
Increase in student numbers in %		–0.009***	–0.009***	–0.011***		−0.009*	−0.010*	−0.011**
Educational expenses per student			0	0			0	0
Local GDP *per capita* (in % of national mean)				−0.005***				−0.003
Local unemployment rate				0.013**				0.009
Intercept	−1.17	−1.39	−1.35	−1.29	−1.11	−1.33	−1.41	−1.41
Intercept variance	0.195	0.186	0.186	0.118	0.119	0.140	0.147	0.106
N	9403	9403	9399	9399	2167	2167	2166	2166
N municipalities	1878	1878	1876	1876	989	989	988	988
Log-likelihood	–5514.725	–5505.481	–5502.835	–5484.881	–1348.085	–1345.022	–1344.162	–1341.345
AIC	11047.45	11030.96	11027.67	10995.76	2714.17	2710.044	2710.324	2708.689

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

ALL MODELS CONTROL
FOR SEX, PROMOTION LEVEL, FIXED-TERM EMPLOYMENT, EDUCATION

With regard to the influence of changing student numbers on the probability of exiting employment in public schools it has been hypothesized that declining student population causes a demand shock on a teacher labour market, which can be eased through early retirement. According to hypothesis 4 I expect, therefore, to find significant effects of a change in student numbers on the exit probability in the group of teachers in early retirement age. At the beginning of the 1990s Poland witnessed a major drop in fertility, which translates to decreasing group sizes of students. However, there is some regional variance as to how strongly different parts of Poland have been affected by low fertility. Utilising this variance it is possible to prove to what extent early retirement transitions are driven by falling levels of demand. Figure 3 shows the age distribution of teachers exiting schools in municipalities with growing and with falling numbers of children of school age.

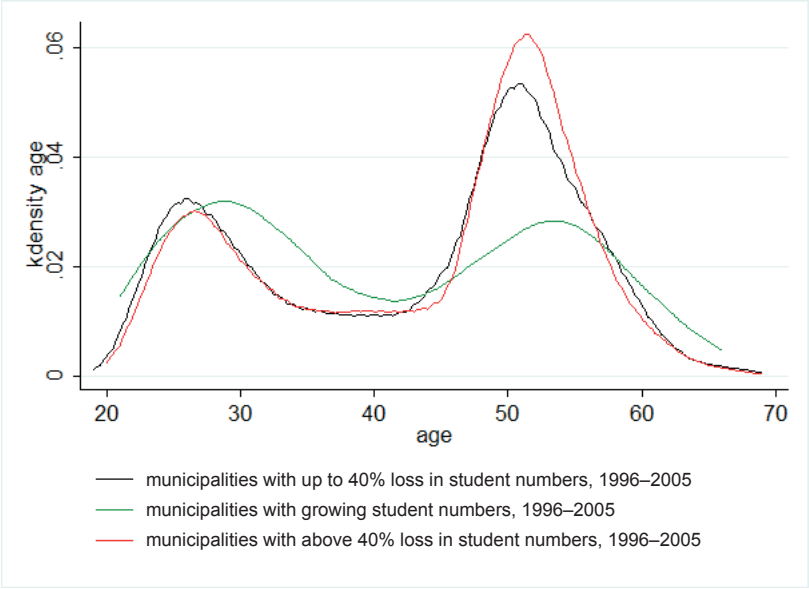

Figure 3. Age distribution of teachers exiting schools in municipalities with growing and falling numbers of children in school age

We can see a clear difference in the distributions. In municipalities with a decreasing student population those exiting schools are predominantly at the age of early retirement eligibility. This descriptive result therefore supports hypothesis 4.

Considering the results of multilevel logistic regression models presented in Table 4 we can, furthermore, assess how much of the inter-municipality variance in the probability to exit employment in different age groups is due to differences in student population dynamics. As I have already discussed with regard to hypothesis 1, the random intercept models not controlling for any municipality-level factors show significant inter-municipality variance in the exit probability in every age group (Model 6a through Model 9a). The variance is highest for teachers aged 49 to 54 and lowest for the group of 27 to 48-year-olds. If the employment exit dynamic is indeed driven by a declining student population I would have to find a drop in municipality-level variance after controlling for change in student numbers. The estimates of the models 6b through 9b show an interesting pattern. The effect of student numbers is not significant for the prime age teachers, highly significant for both "early retirement" groups, and again barely significant for the oldest group of teachers. If we consider the change in the municipality-level variance after controlling for the change in student numbers we notice little change. A drop is negligible in the prime age group. In the group of oldest teachers the estimates even show a rise in variance, which possibly indicates correlations with unobserved municipality-level factors. In contrast, controlling for change in student numbers reduces inter-municipality variance in both "early retirement" age groups. It is to the largest extent in the group of 49 to 54-year-old teachers and to a somewhat lesser extent in the group of 55 to 59-year-olds. Hypothesis 4 thus finds support in the data. At the same time an indeed rather moderate drop in variance indicates that there are other potentially stronger factors driving employment exit behaviour.

In line with the theoretical argument presented above, one such factor could be the level of investment in educational services. Following organisational theory of turnaround I assume that municipalities in the face of a declining student population might react by extending educational offers and increasing educational spending per student, in this way keeping the level of labour demand unchanged. Higher educational spending may therefore compensate for demographic declines in student numbers and diminish the pressure to reduce personnel. If early retirement decisions are structurally induced, higher educational spending should decrease the probability of exit in the "early retirement" age groups. Figure 4 presents the distribution of municipal expenditures on education per student. The distribution is steep and the standard deviation, at 146 thousand zloty, is rather low, indicating little variance in educational expenditures.

In order to check for the effect of the level of expenditures per student on early retirement transitions of teachers we turn to the multilevel logistic regression models (Model 6c through Model 9c) summarised in Table 4. Against expectations we see that controlling for the level of educational spending per student across municipalities does not meaningfully decrease the level of inter-municipality variance in any of the age groups. At the same time, the estimated coefficient is negligible in size and also insignificant, except for the group of prime age teachers, where it is significant only at the 5% level. Hypothesis 5 must therefore be rejected.

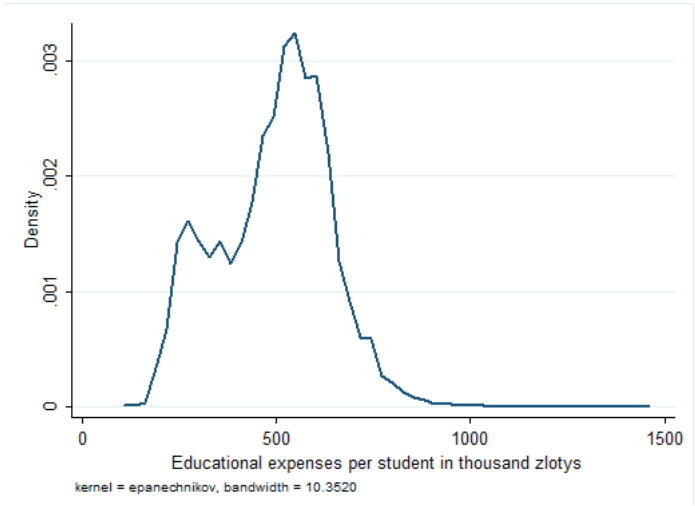

Figure 4. Educational expenses across municipalities. Kernel density plot

On the other hand, controlling for the local economic situation (the level of GDP per capita and the unemployment rate) brings more differentiated results. The multilevel logistic regression models (Model 6d through Model 9d) show that the local GDP per capita (as percentage difference from national mean) and the local unemployment rate significantly influence the probability of exiting employment in schools in the two "early retirement" groups. This effect is also in line with hypothesis 7. Higher GDP per capita and lower unemployment rates reduce the risk of exit among 49 to 54 and 55 to 59-year-olds. In contrast, the effect of these economic indicators in the two other groups is not significant. Furthermore, while controlling for GDP and unemployment rate we also observe a strong decrease in inter-municipality variance in the probability of exit for the groups of 55 to 59-year-old teachers. More than one-third of the entire inter-municipality heterogeneity with regard to exit probability in this group can therefore be attributed to the local economic situation. Hypothesis 7 can therefore be supported. There is also a small drop in variance for the younger group of 49 to 54-year-olds; it is rather negligible, however.

Eventually, in order to test for hypothesis 6 I have estimated random slope models allowing observation of how the effect of different age categories covary across municipalities (for model estimates see the annex). The results provide strong support for hypothesis 6. Indeed there is a negative covariance between the municipality-specific effects on age category 27 to 48 (prime age) and both "early retirement" age categories. This indicates that in municipalities displaying an above-average probability of exit mobility in the prime age group the probability of exit in both "early retirement" age groups is indeed below average. Figure 5 illustrates this point.

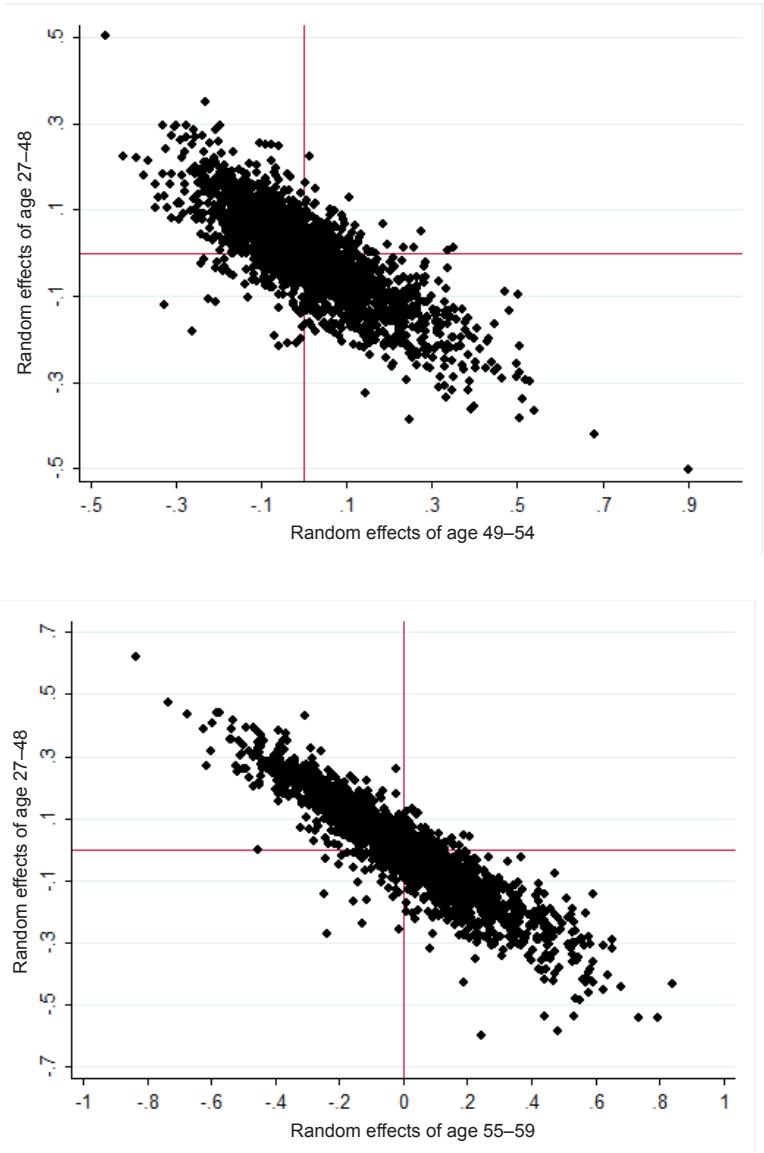

Figure 5. Municipality-specific effects of age group 27–48 against municipality-specific effects of age groups 49–54 and 55–59, respectively

The correlation is stronger for the group of 55 to 59 year olds than for the group of 49 to 54 year old teachers. The correlation coefficient amounts to −0.60 for the 55 to 59-year-olds and −0.29 for the 49 to 54-year-olds.

CONCLUSION

This article contributes to the literature on early retirement transitions by testing a line of explanations of this phenomenon in a specific context of public-sector employment. It utilises a unique dataset containing individual-level information on all teachers employed in Polish public schools in 2006 and 2007. An inspection of the age distribution chart of teachers has revealed two "early retirement" age groups (49–54 and 55–59), on which the following analyses concentrate. Multilevel logistic regression models show a substantial regional variance in the occurrence of early retirement exit, which challenges the view of these transitions being of solely voluntary character. Firstly, despite monetary conditions of early retirement being the same across the whole country I find a considerable variance in the probability of exit in both "early retirement" groups across municipalities. Secondly, regarding the effect of work commitment on early retirement decisions there are regional differences to be found as well. More precisely, work commitment decreases the risk of early exit especially in the younger group (49–54 years), whereas in the older "early retirement" group its effect is not that strong and is more regionally differentiated, indicating that in this second group individual preferences play a smaller role.

Importantly, with regard to Polish teacher labour markets I have not found strong support for the two most often suggested structural dynamics inducing early retirement, i.e. early exit as a reaction to falling demand and/or as means of adaptation to changing human capital demands. With regard to obsolete qualification profiles I do not find any influence on the propensity to early retirement. Teachers being qualified in subjects of instruction which lose importance in the amended national curricula do not face early retirement risks any higher than the average. As far as falling demand and resulting early retirement pressures are concerned, the data show very moderate support for this thesis. A fraction of between-municipality variance in early retirement risk can indeed be attributed to varying dynamics of local student populations. In both "early retirement" groups it is, however, very low and the estimated effect of percentage change in student numbers is very low as well, yet significant.

In contrast the data show that early retirement risks depend more strongly on the one hand on the employment mobility of the prime-age teachers and on the local economic situation on the other. For both "early retirement" groups I find strong effects of the estimated chance of exit mobility in the group of prime-age teachers. In line with the figurational approach to analysing labour market dynamics, the employment chances of potential early retirees are to a great extent influenced by labour mobility of prime-age insiders. Higher levels of labour mobility in the group of prime-age teachers decrease the risk of early retirement. This effect is especially pronounced for the group of older "early retirees" (55 to 59 year olds). Also indicators of regional economic situations influence the probability of early exit and at the same time substantially reduce its inter-municipality variance in the group of 55 to 59-year-old teachers. A better regional economic situation translates to lesser early retirement risks for 55 to 59-year-old teachers. This effect is, however, far less pronounced for the younger "early retirement" group of 49 to 54-year-olds.

All in all the analyses indicate that early retirement transitions of teachers employed in Polish public schools are to a substantial degree driven by employee independent factors.

Early retirement transitions are most strongly influenced by organizational- and regional-level factors in the group of 55 to 59 year olds. It can therefore be concluded that at that age teachers are most at risk of involuntary early retirement.

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DETERMINANTY WCZEŚNIEJSZEGO PRZECHODZENIA NA EMERYTURĘ NAUCZYCIELI W POLSCE. CZY ODGRYWA W NIM ROLĘ ZRÓŻNICOWANIE REGIONALNE?

Artykuł nawiązuje do badań nad procesami przechodzenia na wcześniejszą emeryturę i poddaje analizie najczęściej pojawiające się w literaturze wyjaśnienia tego zjawiska w specyficznym kontekście zatrudnienia w sektorze publicznym. Do analiz ilościowych wykorzystano bazę danych Systemu Informacji Oświatowej (SIO) w części poświęconej przebiegowi karier zawodowych nauczycieli w latach 2006–2007. Tradycyjne wyjaśnienia strukturalne fenomenu wcześniejszego przechodzenia na emeryturę, takie jak konieczność restrukturyzacji zatrudnienia i/lub dewaluacja kapitału ludzkiego starszych pracowników nie znajdują potwierdzenia w analizowanych danych. Modele wielopoziomowe pokazują natomiast, że występujące znaczne zróżnicowanie poziomów ryzyka wcześniejszego przejścia na emeryturę można do pewnego stopnia wytłumaczyć różnymi poziomami mobilności zawodowej wśród nauczycieli w głównym wieku produkcyjnym, co potwierdza tezę o rynku pracy jako figuracji generacyjnej. Analizy wskazują na dwie grupy wiekowe "młodych emerytów" wśród nauczycieli: 49–54 i 55–59 lat. W przeciwieństwie do młodszej z obu grup, gdzie przypadki wcześniejszego przejścia na emeryturę można najczęściej wytłumaczyć, odwołując się do indywidualnych czynników (jak np. zaangażowanie zawodowe), w grupie starszej większe znaczenie ma zróżnicowanie regionalne, co wskazuje na większe ryzyko wymuszonego przejścia na wcześniejszą emeryturę w tej grupie.

Słowa kluczowe: przechodzenie na wcześniejszą emeryturę, sektor publiczny, Polska, nauczyciele, System Informacji Oświatowej, figuracyjna teoria rynku pracy

ANNEX

Table A1. Probability of exiting employment in Polish public schools by age and other factors across municipalities. Random slope logistic regression

Specifications	Model A1	Model A2
Age <27	−2.30	−1.96
Age 27–48	−2.61	−2.26
Age 49–54	−0.39	Reference
Age 55–59	Reference	0.34
Age 60–65	−0.06	0.30
Female	−0.9	−0.09
High work commitment (4th promotion level)	−0.68	−0.68
2nd promotion level and below	0.59	0.58
3rd promotion level	Reference	Reference
Fixed term employment	0.94	0.95
Lower university degree	0.26	0.25
Teachers' vocational training	0.59	0.60
Lower educational level	1.06	1.06
Intercept	−1.11	−1.47
Intercept variance	0.11	0.13
Random effect variance: age 27–48	0.07	0.11
Random effect variance: age 49–54	0.13	
Random effect variance: age 55–59		0.24
Random effect variance: age 60–65		
Covariance of intercept and random effect: age 27–48	−0.06	−0.08
Covariance of intercept and random effect: age 49–54	0.02	
Covariance of intercept and random effect: age 55–59		0.08
Covariance of random effects: age 27–48, age 49–54	−0.03	
Covariance of random effects: age 27–48, age 55–59		−0.10
N	312524	312524
N municipalities	2224	2224
Log-Likelihood	−61528.37	−61530.2
AIC	123092.7	123096.4