MODELLING INVOLUNTARY PART-TIME AND FIXED-TERM EMPLOYMENT AMONG YOUNG PEOPLE AND ADULTS IN BULGARIA

Plamen Dimitrov[1], PhD Student
University of National and World Economy,
Social Resources and Social Protection Department

Abstract: With the labour market becoming increasingly flexible, there has been a growing trend towards non-standard models of temporary employment that allow persons who, for some reason, prefer fixed-term or part-time employment to earn income. Hence, some EU member states have been employing policies and measures to facilitate the access to flexible employment at all levels within organizations, including access to vocational training, so as to provide better career growth and professional mobility opportunities. Furthermore, some categories of employees and workers do not enter into similar employment arrangements voluntarily but are forced to do so by a number of factors such as family commitments, age or disability constraints, education and training, the need to relocate, cyclical economic crises, etc. We propose a methodology for studying the voluntary/involuntary character of two major types of flexible employment – part-time and fixed-term employment, from the perspective of employees, employers and the labour market. The focus of attention is on the groups exposed to the highest risk on the national labour market, i.e. young people aged 15-29 and adults aged 55-64.

Key words: part-time employment; fixed-term contract; regression models; flexible employment.

JEL: M51.

Both theoretical and empirical models of part-time employment, which have been designed so far, deal with various factors and specific features which affect that mode of employment. Business activity is a

[1] E-mail: katedratsz@unwe

major influencing economic factor, the share of part-time employment decreasing during periods of economic upsurge and increasing during economic crises.

There is a similar correlation between fixed-term employment and the state of the economy. This paper presents empirical research of some models of involuntary part-time and fixed-term employment of young adults (aged between 15 and 29) and older adults (aged between 55 and 64). When designing these models, we focused primarily on the economic, social and demographic factors which were identified in the Survey of the labour force in Bulgaria conducted by the National Statistical Institute.

Probability Assessment Models for Voluntary/Involuntary Part-Time Employment

Over the period from 2008 to 2015, about 2.0–2.5% of the employed in all age groups in Bulgaria were in part-time employment. While this was a favourable arrangement for those who had to meet other commitments related to their families, education and training or some other private engagement, it was an arrangement a share of part-time employees were forced to accept since they were not able to find any full-time employment.

In 2008, the share of people in involuntary part-time employment for all age groups in Bulgaria amounted to 51%, the share of young adults in involuntary part-time employment being 24% and that of older adults - 49%. In 2014, the total share of people in all age groups in involuntary part-time employment rose to 64%, followed by a slight decline to 60.7% in 2015. Trends in involuntary part-time employment were more marked for older adults – their share increasing to 68% in 2014 and declining to 55.3% in 2015, whereas the share of young adults in involuntary part-time employment increased to 49.7% in 2014, followed by another increase to 58.8% in 2015.

We have employed logistic regression models to study in-depth the reasons for involuntary part-time employment. Such models are appropriate for assessing the probability of both voluntary and involuntary part-time employment, i.e. when the dependent variable is a binary variable. What is more, in most cases when the predictors are continuous variables, a discriminant analysis is employed, whereas logistic regression is generally employed when all variables are binary or categorical ones, as it is in our case. A further advantage of these models is that they do not pose any constraints on the distributions of independent variables.

When designing these models, the dependent variable is defined as follows: $\mathbf{z_i}$ is a binary variable whose value is 1 when a person in is

involuntary part-time employment and 0 when a person in is voluntary part-time employment.

The logistic models[2] will then be:

$$\ln\left[\frac{P(z_i=1)}{1-P(z_i=1)}\right]=\ln\left[\frac{P(z_i=1)}{P(z_i=0)}\right]= \quad ,$$
$$b_0+b_1\cdot urb_i+b_2\cdot ec\,\mathrm{sec}\,tor_i+b_3\cdot \mathrm{Edu}_i+b_4\cdot gen_i+b_5\cdot age_i+u_i$$

where:

i stands for an individual; $\mathbf{P(y_i=1)}$ is the probability of involuntary part-time employment for individual **i**; $\mathbf{P(y_i=0) = 1- P(y_i=1)}$ is the probability of voluntary part-time employment for individual **i**; $\mathbf{b_j}$ are the assessed coefficients (the estimands); $\mathbf{u_i}$ is a random component. The $\mathbf{urb_i}$ is a binary variable which denotes the region of residence of individual **i** in terms of its urbanization. The value of the variable is 0 when the individual lives in an urban area (with high or moderate density of the population) or 1 when the individual lives in a non-urban area. The $\mathbf{ecsector_i}$ is a binary variable indicating the economic sector in which the individual is employed (1:The Service Industry; 0:Manufacturing). The $\mathbf{Edu_i}$ variable indicates the highest level of the education which the individual has acquired (1: secondary education or below; 2: tertiary education). The binary $\mathbf{Gen_i}$ variable indicates the gender of the employed person (0: Male; 1: Female). The $\mathbf{age_i}$ variable indicates the age of the employed person.

The models provide separate assessments for the age group of young adults (i.e. people aged between 15 and 29) and older adults (i.e. people aged between 55 and 64) based on data provided by the NSI Survey of the employment and unemployment of households in Bulgaria (Table 1 and Table 2). The tables present the estimands, the significance of and the odds ratios for each independent explanatory variable in the final equation. Column 3 presents an estimate of the probability ratio for each of the three years included in the survey. The latter is interpreted as the predicted (projected) change in the odds ratio when the value of the independent variable which that ratio refers to is increased by one unit. When the value of the estimated odds ratio exceeds 1, an increase in the independent variable will imply higher probability of exposure to involuntary part-time employment. When the value

[2] For a more detailed description of logistic models and probability ratios, see further Fleys, Dzh. (1989). Statisticheskiye metodi dlya izucheniya doley i proportsii. Moskva, Finansi i statistika, pp. 77-79 and Kleinbaum, D., G. Klein, M. (2010). Logistic Regression A Self-Learning Text, Third Edition. Springer Science+Business Media LLC.

of **exp(B)** is less than 1, an increase in the independent variable will imply lower probability of exposure to involuntary part-time employment.

When designing the regression models, we tested numerous predictors and explanatory variables. Estimated regression equations enable us to project the odds ratio $\log\frac{P(z_i=1)}{P(z_i=0)}=\frac{P(z_i=1)}{1-P(z_i=1)}$, as well as the probability of involuntary or part-time employment. If we ignore random errors, the latter may be expressed through the equation:

$$P(z_i=1)=\frac{\exp(b_0+b_1\cdot urb_i+b_2\cdot ec\sec tor_i+b_3\cdot \mathrm{Edu}_i+b_4\cdot gen_i+b_5\cdot age_i)}{1+\exp(b_0+b_1\cdot urb_i+b_2\cdot ec\sec tor_i+b_3\cdot \mathrm{Edu}_i+b_4\cdot gen_i+b_5\cdot age_i)}.$$

By employing regression models, we are able to examine the factors affecting that type of employment among various groups (e.g. young and older adults) on the labour market after eliminating the impact of other factors. The logistic models certainly have their advantage over the normal distribution model when modeling relative shares and ratios. Therefore, the models proposed by Cox (Cox, D. R., 1970) and Fienberg (Fienberg, S. E., 1977) are employed.

Compared to models which only include an independent variable, logistic models with included variables provide a clearer classification of people in part-time employment (the only exception being in the case of young adults in 2008) according to the reason behind that type of employment, i.e. whether it is voluntary or involuntary. Even in the case of the year 2008, the trivial model (including an independent variable only) is successful in the classification of 75% of the surveyed people in part-time employment. As a matter of fact, that model considers all people in part-time employment to be voluntarily employed under such arrangements. The logistic model enables us to classify the people who are in involuntary part-time employment (in 60% of the cases) and those who are in voluntary part-time employment (in 79% of the cases). Thus, in 74.4% of the cases, the groups of voluntary and involuntary part-time employees and workers have been successfully classified. In contrast to the trivial model, this model also provides a more accurate classification of the people who are in involuntary part-time employment. In the group of older adults in voluntary or involuntary part-time occupation, 51.4% of part-time employees and workers were successfully classified by applying the trivial model, compared to 69.8% of part-time employees and workers successfully classified by applying the ultimate model, i.e. the accuracy of the classification increased by nearly 18%.

The assessment models are also highly efficient in distinguishing

between individuals who are voluntary and in involuntary part-time employment, especially those in 2014 and 2015. While trivial models, which only include constants, were successful in 49.7% of the cases in 2014 and 58.8% of the cases in 2015 when applied to the group of young adults, ultimate models were successful in 61.5% and 82% of the cases, respectively. What is more, we were able to accurately classify the people who were in involuntary part-time occupation in 85% of the cases in 2014 and in 82% of the cases in 2015, which is a very high percentage of accuracy.

Furthermore, by applying these models, we classified people in involuntary part-time employment in 2014 in 35% of the cases and in 2015 – in 82% of the cases, which is sufficiently high accuracy.

Table 1. **Probability ratios of voluntary/involuntary part-time employment for young adults (aged 15–29) in Bulgaria in 2008, 2014 and 2015**

Variable	2008			2014			2015		
	B	Sig	Exp(B)	B	Sig	Exp(B)	B	Sig	Exp(B)
urb(1)	1,709	,000	5,522	1,656	,000	5,239	2,006	,000	7,436
ecsector(1)	-	-	-		-	-	-,346	,015	,708
Edu	-	-	-		-	-	-1,928	,000	,145
gen(1)	-,841	,000	,431	-,697	,000	,498	,493	,000	1,637
age	,049	,000	1,050	,124	,000	1,132	,319	,000	1,376
Constant	-2,949	,000	,052	-3,301	,000	,037	-7,476	,000	,001

Source: Estimates made by the author, based on the annual individual anonymised data provided in the NSI Survey of the workforce in 2008, 2014 and 2015.

Table 2. **Probability ratios of voluntary/involuntary part-time employment for older adults (aged 55–64) in Bulgaria in 2008, 2014 and 2015**

Variable	2008			2014			2015		
	B	Sig	Exp(B)	B	Sig	Exp(B)	B	Sig	Exp(B)
urb(1)	1,258	,000	,475	-,188	,012	,829	,580	,000	1,785
ecsector(1)	1,031	,000	3,518	-	-	-	1,272	,000	3,569
Edu	-,413	,000	2,803	-1,147	,000	,318	-1,832	,000	,160
gen(1)	-,745	,000	,889	-	-	-	-	-	-
Age	-,118	,000	,662	-,105	,000	,900	-,083	,000	,921
Constant	6,068	,000	431,719	7,098	,000	1209,826	4,349	,000	77,379

Source: Estimates made by the author, based on the annual individual anonymised data provided in the NSI Survey of the workforce in 2008, 2014 and 2015.

As the table indicates, when applying a 5% criterion of statistical significance, all variables have statistically significant independent effects.

The value of the odds ratio for the **urb(1)** variable, i.e. residence in an urban area, exceeded 5 for young adults in 2008 and increased to 7.436 in 2015. Thus, according to the estimates of the model for the year 2005, the probability ratio of involuntary part-time employment for residents of non-urban areas was 7.5 times as high as that for people who live in urban areas, all other variables remaining constant.

At the same time, estimates indicate that age is a major predictor of involuntary part-time employment to both young and older adults, yet its significance is in opposite directions. To both groups, the variable changes for single age segments. The estimates of the odds ratio exceed 1 for young adults, while those for older adults are below 1 for all years included in the survey. Hence, an increase in the age of young adults by 1 year implies a greater probability of involuntary part-time employment, whereas a similar increase in the age of older adults implies lower probability of involuntary part-time employment. Furthermore, while an increase by 1 year in the age of young adults correlated to a 5% increase in the probability of involuntary part-time employment in 2008, the same increase in age implied a 13% increase in the probability in 2014 and 37.8 % in 2015. In the older adults group, an increase in age by 1 year corresponded to lower probability of involuntary part-time employment by 34% in 2008, by 10% in 2014 and by 7.9% in 2015.

The highest levels of acquired education and training which the **Edu** variable stands for are secondary education or below and tertiary education. The education acquired by the people in the first group is secondary or below. This group was identified as the reference group for the estimates. The estimates of the odds ratios for the **Edu** variable indicate that in 2015, the probability of involuntary part-time employment for young adults with tertiary education was nearly 6.9 times as low as that for people with secondary education or below, all other variables remaining constant. In 2008, the odds ratio of involuntary part-time employment for older adults with tertiary education was 2.8 times as high as that for people with secondary education and below in their age group, ceteris paribus. In 2014 and 2015, the trend reversed and the odds ratio of involuntary part-time employment for people with tertiary education was 3.1 and 6.3 times as low as that for people with secondary education or below.

The **gen** variable (indicating the gender identity of the individuals) had significant coefficients for young adults in all three years, while in the older adults group this was the case in 2008 only. The values of the odds ratio of the **gen** variable were less than 1 in all years, except for the year 2015. This indicates that the probability of involuntary part-time employment for women was lower than that for men by 58% in 2008 and by 50% in 2014 in the young

adults group and by 11% in the older adults group. In 2015, however, in the young adults group, the probability of involuntary part-time employment for women was higher by 64% than that for men.

The **ecsector** predictor indicates the economic sector in which the individual is employed part-time. The coefficients of the variable were significant for the young adults group in 2015 only, while for the older adults group that was the case in 2008 and 2015 as well. The survey only focused on two sectors - the service sector and all the other sectors. The odds ratios for the **ecsector** variable were below 1 for younger adults in 2015 and exceeded 1 for older adults. In other words, the probability of involuntary part-time employment for young adults employed in the service sector was lower by 29% in 2015. The probability of involuntary part-time employment for older adults in the service sector was 3.5 times as high in both 2008 and 2015.

Probability Assessment Models for Voluntary/Involuntary Fixed-Term Employment

In general, there are two approaches to studying and describing the advantages and disadvantages of fixed-term employment (Greppi, S., Lucchini, M., Assi, J. & Marazzi, C., 2010). One of them interprets fixed-term contract employment as necessary and positive to both employers and employees. Such contracts help employers regulate employment according to the demand for goods and services during cyclical fluctuations of the economy. On the other hand, fixed-term contracts are an attractive option for workers and employees as well since they provide them with an opportunity to enter and integrate in the labour market; to gain work experience; to develop skills; to expand their social and professional networks (Aleksynska, M. & Muller, A., 2015). According to that approach, fixed-term contracts are not merely a mechanism for sharing the risk related to the regulation of employment in terms of demand, but also a useful and necessary ‘bridge’ to permanent employment for fixed-term employees.

The second approach considers fixed-term employment to be a ‘trap’ and a mechanism for the unequal distribution of the risk which is primarily borne by fixed-term employees through their frequent oscillating movement between temporary employment and unemployed status.

Regardless of the approach which is employed to describe fixed-term employment, studying the voluntary/involuntary nature of fixed-term contracts contributes to better understanding the essence of non-standard employment and the opportunities it may provide to employers, employees and the labour market. At the same time, the issue of the nature of fixed-term

contracts is relatively new. As Spartaco Greppi, Mario Lucchini, Jenny Assi and Christian Marazzi noted in their survey of the reasons for fixed-term employment contracts in Switzerland in 2010, the first debates about the dual nature of such contracts (i.e. 'bridges' or 'traps') took place in 1989 (Buchtemann Christoph F. & Sigrid Quack, 1989). Later on, the debate expanded to other countries (e.g. Germany) as well (McGinnity, F. & Mertens, A., 2002).

We studied the reasons for fixed-term employment of young and older adults by using data provided in the surveys of the labour force which the National Statistical Institute conducted in 2008, 2014 and 2015. The sample includes between 25,000 and 35,000 people in fixed-term employment. The share of young adults aged between 15 and 29 increased from 47.8% in 2008, to 55.3% in 2014 and to 66% in 2015. The share of older adults (aged between 55 and 64) in involuntary fixed-term employment was 65.2% in 2008; 61.7% in 2014 and 79.9% in 2015. The rest of the individuals in both age groups were employed on fixed-term contracts voluntarily, i.e. that type of employment arrangement conformed better to their preferences or was an instance of flexibility.

This paper focuses on the probability assessment of voluntary and involuntary fixed-term employment. Hence, the dependent variable is binary, its value being 1 when an individual is in involuntary fixed-term employment (i.e. due to the impossibility to find permanent employment) and 0 when an individual is in voluntary fixed-term employment (due to some personal preferences).

When designing the logistic model, we included various predictors and selected only those which proved to be significant. The independent variables which we initially employed were the economic sector (agriculture, industry and services) in which the individuals are employed; their gender; their age; their residence (in an urban or non-urban area); the highest level of education which they had acquired, etc.

The regression logistic model for studying the voluntary/involuntary nature of fixed-term contracts in Bulgaria in 2008, 2014 and 2015 may be summarized as follows:

$$\ln\left[\frac{P(z_i=1)}{1-P(z_i=1)}\right]=\ln\left[\frac{P(z_i=1)}{P(z_i=0)}\right]= \qquad ,$$

$$b_0+b_1\cdot ec\,\mathrm{sec}\,tor_i+b_2\cdot urb_i+b_3\cdot age_i+b_4\cdot gen_i+b_5\cdot ocl_i+b_6\cdot \mathrm{Edu}_i+b_7\cdot incl_i+u_i$$

where:

i stands for an individual; $\mathbf{b_j}$ stands for estimated coefficients and $\mathbf{u}_i$ is a random component. $\mathbf{P(z_i=1)}$ is the probability of voluntary fixed-term employment for individual **i,** and

$$P(z_i=1)=\frac{\exp(b_0+b_1\cdot ecsector_i+b_2\cdot urb_i+b_3\cdot age_i+b_4\cdot gen_i+b_5\cdot ocl_i+b_6\cdot Edu_i+b_7\cdot incl_i)}{1+\exp(b_0+b_1\cdot ecsector_i+b_2\cdot urb_i+b_3\cdot age_i+b_4\cdot gen_i+b_5\cdot ocl_i+b_6\cdot Edu_i+b_7\cdot incl_i)}.$$

Then $P(z_i=0) = 1- P(z_i=1)$ is the probability of voluntary fixed-term employment for individual **i**. The $\mathbf{ecsector_i}$ variable is binary and stands for the economic sector in which individual **i** is employed (the service sector and the non-service sector, i.e. agriculture and industry). The value of the variable was 1 for individuals employed in the service sector and 9 for individuals employed in the non-service sector. The $\mathbf{urb_i}$ variable is also binary and indicates the residence of individual **i** in terms of urbanization. The value of the variable is 0 for individuals residing in urban areas (with high or moderate density of the population) and 1 for individuals residing in non-urban areas. The $\mathbf{age_i}$ variable indicates the age of individuals in years and the $\mathbf{gen_i}$ variable indicates their gender (0: Male and 1: Female). The $\mathbf{Edu_i}$ variable indicates the highest level of education acquired by individuals (secondary education or below and tertiary education). The value of the variable equals 1 for employees/workers with tertiary education and 0 for employees/workers who have acquired secondary education or below.

The $\mathbf{Oc1_i}$ variable may take on three different values (1: the group of Executives and Analytical specialists; 2: the group of other professions which require some qualifications; 0: the group of jobs and occupations which do not require any qualifications). The **incl** variable indicates whether an individual belongs to any of the three bottom deciles of net monthly salary (0: yes, 1: no).

The coefficients of the estimated logistic regressions for the years 2008, 2014 and 2015 are presented in Table 3 (for young adults aged between 15 and 29) and Table 4 (for older adults aged between 55 and 64). The tables also indicate the significance of and the odds ratios for each explanatory variable in the final equation.

In contrast to logistic models which only include constant variables, the assessment models may successfully be employed for classification. Similar to the probability models of involuntary part-time employment, there is only one exception in the case of the older adults group for the year 2015. Nevertheless, even in that case we were able to successfully classify the employees/workers on fixed-term contracts in 79.9% of the cases.

For the year 2008, the trivial model (including only an independent variable) was successful in classifying 52.2% of the young adults in fixed-term employment, whereas the efficiency of the probability assessment model was 57.7%. Similarly, 75.4% of the individuals in the group of older adults were accurately classified by applying the ultimate model, whereas the trivial model was successful in 65% of the cases.

The assessment models also proved to be efficient in distinguishing between people in voluntary and involuntary fixed-term employment in 2014 and 2015. The efficiency of the trivial models (including only constant variables) was 55.3% for the year 2014 and 65.8% for the year 2015 in the young adults group. The efficiency of ultimate models was 65.1% for the year 2014 and 73.2% for the year 2015. In the group of older adults, the efficiency of the first type of models was 62.7% for the year 2014 and 73.3% for the year 2015. In contrast, the ultimate models applied to fixed-term employees were successful in 66.7% of the cases for the year 2014 and in 79.9% of the cases for the year 2015.

Table 3. **Probability ratios for voluntary/involuntary fixed-term employment of young adults (aged 15–29) in Bulgaria in 2008, 2014 and 2015**

Variable	2008			2014			2015		
	B	Sig	Exp(B)	B	Sig	Exp(B)	B	Sig	Exp(B)
ecsector(1)	,302	,000	1,352	-,611	,000	,543	,615	,000	1,850
urb(1)	,349	,000	1,418	,848	,000	2, 335	2,012	,000	7,478
Age	,110	,000	1,116	-,020	,002	,980	,160	,000	1,173
gen(1)	,300	,000	1,350	,197	,000	1,217	-	-	-
oc1	-	-	-	-	-	-	-	-	-
oc1(1)	-2,181	,000	,113	-	-	-	-	-	-
oc1(2)	-,395	,000	,674	-	-	-	-	-	-
Edu	-	-	-	-,437	,000	,646	-,709	,000	,492
Incl	-	-	-	,753	,000	2,124	-,464	,000	,628
Constant	-2,789	,000	,062	,361	,023	1,435	-4,252	,000	,014

Source: Estimates made by the author, based on the annual individual anonymised data provided in the NSI Survey of the workforce in 2008, 2014 and 2015.

Table 4. **Probability ratios for voluntary/involuntary fixed-term employment of older adults (aged 55–64) in Bulgaria in 2008, 2014 and 2015**

Variable	2008			2014			2015		
	B	Sig	Exp(B)	B	Sig	Exp(B)	B	Sig	Exp(B)
Ecsector(1)	,366	,000	1,442	,181	,012	1,198	,279	,004	1,322
urb(1)	,765	,000	2,148	,249	,001	1,283	1,637	,000	5,140
Age	-,411	,000	,663	-,022	,083	,978	-,108	,000	,898
Gen	1,548	,000	4,700	,937	,000	2,553	,263	,004	1,301
oc1	-	-	-	-	-	-	-	-	-
oc1(1)	-1,966	,000	,140	-	-	-	-	-	-
oc1(2)	-1,592	,000	,204	-	-	-	-	-	-
Edu	-	-	-	-1,012	,000	,364	-	-	-
Incl	-	-	-	-,979	,000	,376	--	-	-
Constant	24,409	,000	3,985E10	1,655	,030	5,235	6,576	,000	717,767

Source: Estimates made by the author, based on the annual individual anonymised data provided in the NSI Survey of the workforce in 2008, 2014 and 2015.

If we apply a 5% criterion of statistical significance, all included variables have statistically significant independent effects. As the data in the tables above indicate, the odds ratios of the variables (**ecsector, urb, age** and **gen**) exceeded 1 for young adults in 2008. This implies that for female employees in the service sector who reside in a non-urban area and whose age increases by a year, the probability of involuntary fixed-term employment is by 35%, 35.2%, 41.8% and 11.6% higher than the same probability for male employees in the non-service sector who reside in urban areas and whose age is constant (the other variables in the equation remaining constant).

The odds ratios for the last significant variable in the model, **oc1,** indicate that in the group of young adults in 2008, the standard group was that of workers without qualifications. For the individuals in the first group, Executives and Analytical specialists, the odds ratio is **Exp(B)**=0.113. The latter indicates that the probability of involuntary fixed-term employment for them is about 8.8 times as low as that for individuals without qualifications. For the second group of professionals (i.e. employees and workers with qualifications) the odds ratio of involuntary fixed-term employment is obviously lower, too – 1.5 times as low as that for individuals without qualifications.

Similarly, the values of the odds ratios of the variables **ecsector, urb** and **gen** in the table presenting data about older adults exceeded 1 in 2008. Hence, for people aged between 55 and 64, the probability of involuntary

fixed-term employment was higher for people employed in the service sector than for individuals employed in the non-service sector by 44.2%; the odds ratio for residents of non-urban area was 2.15 times as high as it was for residents of urban areas; the odds ratio for female workers and employees in the group was 4.7 times as high as it was for their male counterparts, ceteris paribus.

The odds ratio of **oc1** for older adults in 2008 indicates that for people in the first group, Executives and Analytical Specialists, Exp(B)=0.14, i.e. the probability of involuntary fixed-term employment was 7 times as low as that for people without qualifications. In the second group (workers and employees with qualifications), the probability of involuntary fixed-term employment was 4.9 times as low as that of individuals without qualifications.

As a whole, these trends remained the same for both young and older adults in 2014 and 2015. New trends also appeared. In 2015, residence became a more significant factor for the group of young adults – the probability of involuntary fixed-term employment for people residing in non-urban areas was 7.5 times as high as that for people residing in urban areas. On the other hand, the type of occupation was not a significant factor in 2014 or 2015. For both young and older adults, the highest educational level acquired by the individuals and their belonging to one of the three bottom deciles in terms of the net monthly salary were more significant. Thus in 2015, the probability of involuntary fixed-term employment for young adults with tertiary education was twice as low as that for young adults with secondary education or below. In 2015, the probability of involuntary fixed-term employment for young adults who did not belong to any of the three bottom deciles in terms of the net monthly salary was 1.6 times as low as that for young adults belonging to those three deciles.

In conclusion, in both cases, the models make it possible to estimate predicted changes in the indicators of voluntary/involuntary part-time and fixed-term employment when the independent variables change as a result of employing adequate instruments to support sustainable employment. Hence, a policy of opening more part-time jobs and providing greater opportunities for fixed-term employment on a voluntary basis, instead of a policy forcing young and older adults to enter into similar employment arrangements may encourage individuals who would otherwise be reluctant to start a job to join the labour market.

References

Aleksynska, M., Muller, A. (2015). Nothing more permanent than temporary? Understanding fixed term contracts. Inwork and Governance. PoIicy Brief No 6, ILO, Geneva, March.

Beleva, I., Tsanov, V., Dimitrova, D. (2014). Segmentatsiya na pazara na truda v Balgariya, AI Prof. M. Drinov, S.

Beleva, I. (2012). Krizata na evropeyskite trudovi pazari, AI Prof. M. Drinov, S.

Buchtemann Christoph F., Sigrid Quack. (1989). Bridges or Traps? Non-Standard. Employment in the Federal Republic of Germany, in: G. Rodgers, I. Rodgers, (ed.): Precarious Jobs in Labour Market Regulation: The Growth of Atypical Employment in Western Europe, Geneva, International Institute for Labour Studies.

Cox, D. R. (1970). The analysis of binary data. Methuen, London.

Fienberg, S., E. (1977). The analysis of cross-classfied categorical data. Cambridge, Mass, M,I,T Press.

Fleys, Dzh. (1989). Statisticheskiye metodi dlya izucheniya doley i proportsii. Moskva, Finansi i statistika.

Greppi, S., Lucchini, M., Assi, J., Marazzi, C. (2010). The determinants of fixed-term contracts in contemporary Switzerland. FORS Working Paper Series, paper 2010-4. Lausanne: FORS.

Hristoskov, Y., Beleva, I., Tsanov, V., Shopov, G., Lukanova, P. (2012). Pazarat na truda i sotsialnata zashtita v ikonomicheskoto razvitie na Balgariya 1990-2011. AI Prof. M. Drinov, S.

Kleinbaum, D., G. Klein, M. (2010). Logistic Regression A Self-Learning Text Third Edition Springer Science+Business Media LLC.

McGinnity, F., Mertens, A. (2002). Fixed-term contracts in East and West Germany: low wages, poor prospects? Max Planck Institute for Human Development (MPIB).

Natsionalen statisticheski institut. (2008). Nablyudenie na rabotnata sila. S.

Natsionalen statisticheski institut. (2014). Nablyudenie na rabotnata sila. S.

Natsionalen statisticheski institut. (2015). Nablyudenie na rabotnata sila. S.

Natsionalna programa za razvitie na Republika Balgariya: Balgariya 2020, www.gb.government.bg/Documents/.../NDP_BG2020_12_2012-bg.pdf

ECONOMIC ARCHIVE

YEAR LXX, BOOK 4 – 2017

CONTENTS

This issue has been published with the financial support of the Scientific Research Fund at the Ministry of Education and Science as part of the project No NP 04/68 approved by the Editorial Board from the competition "Bulgarian Scientific Periodicals – 2016."

Editorial address:
2, Emanuil Chakarov street, Svishtov 5250
Prof. Andrey Zahariev, PhD – editor-in-chief
☎ (++359) 889 882 298
Deyana Vesselinova – Technical Secretary
☎ (++359) 631 66 309, e-mail: nsarhiv@uni-svishtov.bg
Albena Aleksandrova – computer graphic design
☎ (++359) 882 552 516, e-mail: a.aleksandrova@uni-svishtov.bg

ISSN 0323-9004

Economic Archive

Svishtov, Year LXX, Issue 4 - 2017

D. A. TSENOV ACADEMY OF ECONOMICS
SVISHTOV

Икономически архив
Година LXX, книга 4 - 2017
Economic Archive
Year LXX, Issue 4 - 2017

Requirements to be met when depositing articles for Narodnostopanski arhiv journal

1. Number of article pages: from 12 to 25 standard pages
2. Deposit of journal articles: one printout (on paper) and one in electronic form as attached file on E-mail: NSArhiv@uni-svishtov.bg
3. Technical characteristics:
- performance Word 2003 (minimum);
- size of page – A4, 29-31 lines and 60-65 characters on each line;
- line spacing 1,5 lines (At least 22 pt);
- font – Times New Roman 14 pt;
- margins – Top - 2.54 cm; Bottom - 2.54 cm; Left - 3.17 cm; Right - 3.17 cm;
- page numbering– bottom right;
- footer text– size 10 pt;
- graphs and figures– Word 2003 or Power Point.

4. Layout:
- title of article, name of author, academic position and academic degree – font Times New Roman, 14 pt, with capital letters Bold – centered;
- workplace, postal address, telephone and E-mail;
- abstract in Bulgarian up to 15 lines; key words–3 to 5;
- JEL classification of publications on economic topics (http://ideas.repec.org/j/index.html);
- main body (main text);
- tables, graphs and figures are software inserted in the text (they should allow linguistic corrections and translation in English). Numbers and text in them should be written with font Times New Roman 12 pt;
- formulas are inserted with Equation Editor.

5. Rules for footnote: When citing sources, authors should observe the requirements of **APA Style** at http://www.apastyle.org/ or at http://owl.english.purdue.edu/owl/resource/560/01/ or at http://www.calstatela.edu/library/guides/3apa.pdf.

Each author is responsible for promoting ideas, content and technical layout of the text.

6. Manuscripts of lecturers without an academic rank should be accompanied by a transcript of the minutes of the Department meeting at which the proposed paper was discussed.

From 1st of January 2017 the English language title of the journal is changed from "Narodnostopanski archiv" (transliterated from Bulgarian) to "Economic Archive".

Authors of papers published in Narodnostopanski arhiv journal are responsible for the authenticity of the materials.

From the Editorial Board

www.uni-svishtov.bg/NSArhiv