HUMAN CAPITAL AND LABOR FLOWS OUT OF THE AGRICULTURAL SECTOR: EVIDENCE FROM SLOVENIA

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ABSTRACT

This paper analyses the determinants of agricultural labor flows and the role of human capital in this process on the basis of the Slovenian Labor Force Surveys for the years 1993 to 1999. The household heads living in larger households, having a larger farm size, and working full-time (more hours per week) in permanent jobs are more likely to stay in agricultural employment. The empirical evidence clearly suggests that human capital plays a crucial role for labor mobility and labor adjustment. Young, female and educated individuals are more likely to enter into employment in non-agricultural, particularly service activities. There are remarkable circular flows of elderly and less educated persons between being employed in agriculture, unemployment and retirement pools. Small-scale and part-time farming provide temporary employment opportunities. Investments in human capital to improve quality of labor in agriculture and to increase mobility and flexibility of labor are the key issues in synergy reducing labor mismatch and improving efficiency in labor flow adjustment.

Keywords: Slovenia, Human capital, Labor adjustment

INTRODUCTION

With economic and institutional liberalization during the 1990s labor markets in most Central and Eastern European transition economies (CEECs) have experienced considerable changes reducing job security and increasing labor shedding and leading to more intersectoral labor flows in the economy. There are a few macro-economic studies looking at the driving forces behind agricultural labor adjustment in CEECs (Swinnen et al., 2000; OECD, 2001; Dries and Swinnen, 2002). Furthermore, a lot of attention has been given to the buffer role that agriculture has played during transition (Seeth et al., 1998; Leiprecht, 1999, Bojnec et al., 2002). However, to this date little is known about the micro-economic aspects of labor flows out of the agricultural sector during transition. This paper explicitly studies the following questions: who is leaving the agricultural sector and where are they going. More specifically, we will look at the role that human capital is playing in the determination of agricultural labor flows. We use data from the Slovenian labor force surveys for the years 1993 to 1999.

The paper is structured as follows. First, we describe the demographic structure of the different sectors in the economy. In the next sections we derive theoretical hypotheses and run an econometric estimation model to determine the factors that explain agricultural labour flows. In the last section we derive conclusions and policy implications.

THE DEMOGRAPHIC STRUCTURE OF THE SLOVENIAN LABOR ECONOMY

We use Labour Force Survey (LFS) data provided by the Slovenian national statistical office. The LFS was introduced in Slovenia in 1993 and was conducted on an annual basis until 1996. Since the second quarter of 1997 the LFS has been carried out quarterly. Despite the methodological changes that have been carried out over the years, the LFS is representative for the total economy and allows for year to year comparisons.

More than 10% of the Slovenian labour force is engaged in agriculture, forestry and fishing.[1] The agricultural share in employment increased from 11.1% in 1993 to 13.7% in 1997. Since 1997, it has declined to the level of 11.4% in 1999. The industry share in employment shrunk from 44.2% in 1993 to 37.2% in 1999, while the service share in employment has increased from 44.8% in 1993 to 51.3% during the same time. Hence, more than half of employment is currently in service activities.

Table 1. Employment status of people in the agricultural sector.

	1993		1994		1995		1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Employee in enterprise	196	17	183	14	151	10	148	11	103	9	76	7	66	6
Employee at artisan	33	3	20	2	47	3	31	2	19	2	21	2	21	2
Farmer and employee at individual farm	531	47	454	36	503	35	456	34	294	25	279	27	319	30
Unpaid family worker	108	10	188	15	253	17	171	13	103	9	108	10	135	13
Unemployed	36	3	49	4	67	5	58	4	106	9	106	10	110	10
Retired	110	10	175	14	252	17	279	21	318	27	291	28	253	24
Housewife	106	9	185	15	160	11	157	12	152	13	113	11	103	10
Other	12	1	13	1	21	1	36	3	79	7	53	5	47	4
Total	1132	100	1267	100	1454	100	1336	100	1174	100	1047	100	1054	100

Source: Own calculations on the basis of the Slovenian LFS

Within agricultural employment, the category of the farmer and the employee in an individual farm is the most important employment category, but its importance declines over time (Table 1). With the transformation and privatisation of former "socially-owned" farms, the number of employees in an agricultural enterprise declined. At the same time, an increasing share of agricultural employment is made up by unpaid family workers, unemployed and in particular retired people. The other categories of agricultural employment seem to be more stable.
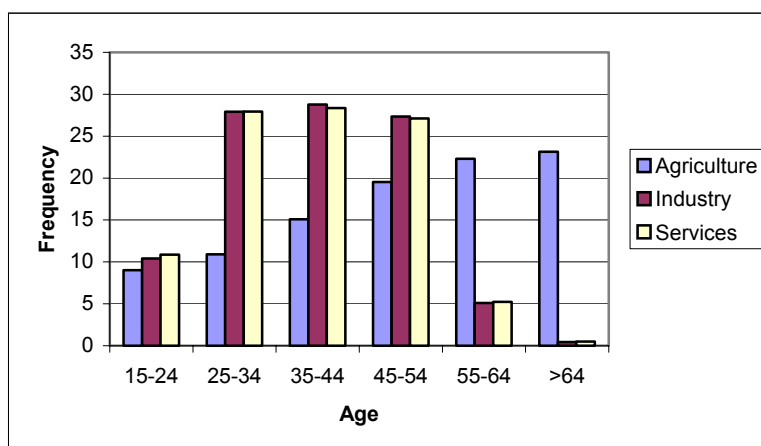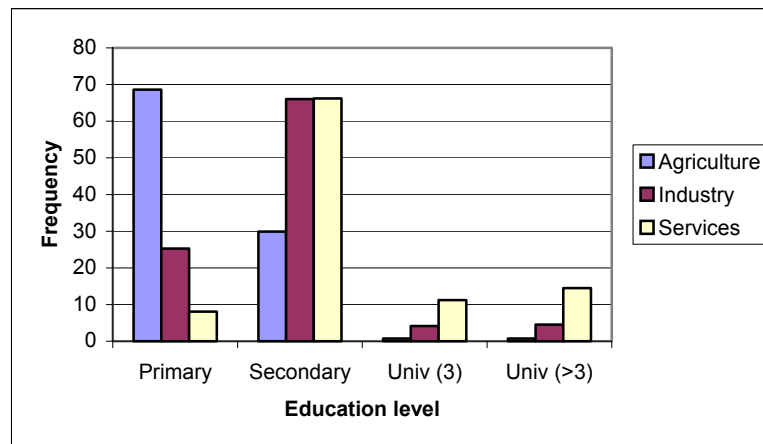

Source: Own calculations on the basis of the Slovenian LFS.

Figure 1. Sectoral age distribution, 1999.

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[1] Wherever in this paper appears agriculture, it means agriculture, forestry and fishing.

Figure 1 presents the sectoral age distribution. Employment in the industry and service sectors have a similar age distribution, with more than 85% of all employees between 25 and 55 years old. The agricultural sector, however, is characterised by an important share of the labour force in the high age classes: 45% of people working in the agricultural sector are 55 years or older.

Source: Own calculations on the basis of the Slovenian LFS.

Figure 2. Sectoral education levels, 1999.

Figure 2 shows the highest level of education for the labour force in different sectors. The figure confirms the unfavourable demographic structure of the agricultural sector. Only 30% of agricultural employment has a degree higher than that of primary education. The attained level of education is better in industry as the majority of employees are with at least some kind of secondary education. Employees in the service sector have on average finished at least secondary education and about 25% have a university degree.

The previous has shown that the agricultural sector is endowed with a relatively low level of human capital. This has obvious consequences for the dynamics of the sector and will be especially detrimental for the non-farm employment opportunities of people employed in this sector. The next section will take a closer look at the factors that determine the labour flows out of the agricultural sector.

THEORY AND HYPOTHESES

We start from a model of labour supply based on Cogan (1981). Cogan's paper shows that the existence of fixed costs (time and money) of working raise the reservation wage compared to a situation without these fixed costs. Following Edwards and Field-Hendrey (2002) we extend Cogan's model by allowing for differences in wage offers between different sectors. Furthermore, we allow for wage differentials based on individual human capital characteristics. From the individuals' utility maximization decision follows that: (1) younger individuals are more likely to change jobs because they have less psychological attachment to the sector; (2) better educated individuals are more likely to take up other employment because of the assumed higher wage possibilities in alternative employment; (3) single people are more likely to change jobs because they have less family attachments; (4) the more time individuals spend on their farm, the less likely they are to leave the sector; (5) employees in a farm are more likely to leave the sector than members of a farm household. The last two hypotheses have to do with the involvement of the individuals with agriculture 'as a way of living'.

EMPIRICS

We apply a two step modelling approach where we estimate the determinants of who is flowing out of the agricultural sector in a first step and we model the factors that are relevant for explaining where these people are going in a second step. To take into account possible sample attrition we will include the inverse Mill's ratio in the second probit estimation. If the inverse Mill's ratio has a significant coefficient in this second regression, this means estimating both equations separately would have led to selection bias.

In the first probit model, we define the dependent variable as a dummy that takes the value of 0 if the person stays in the agricultural sector and it takes the value of 1 if the person flows out of the sector. In the second model the dependent variable is a dummy that takes the value of 0 if the person flows from agriculture into retirement or unemployment and it takes the value of 1 if the person flows into the industrial or services sector.

Table 2. Regression results: Labour flows from agriculture.

Variable	Coefficient	z-value		Coefficient	z-value	
	Selection			**Flows**		
Individual characteristics						
AGE	-0.028	-2.77	***	-0.077	-2.72	***
AGE2	0.000	4.53	***	0.001	1.34	
GENDER	0.288	5.66	***	-0.048	-0.2	
MARRIED	-0.137	-2.12	**	-0.247	-1.39	
PRIMARY	0.060	0.37		-1.802	-4.99	***
SECONDARY	0.106	0.65		-1.368	-3.72	***
SEARCH	0.931	9.52	***	0.599	0.86	
Job characteristics						
HOURWEEK	-0.015	-10.35	***	-0.012	-1.07	
FIRMSIZE	-0.140	-3.92	***	0.149	1.05	
HH characteristics						
HHMEMBER	-0.006	-0.40		0.056	1.58	
FARMHH	-0.549	-9.88	***	-0.391	-0.87	
Additional						
YEAR	-0.192	-11.23	***	-0.154	-1.04	
MILLS	-	-		1.250	1.11	
Intercept	1.453	4.61	***	2.286	4.21	***
No of observations	3344			978		

Levels of significance: * 10%, ** 5%, *** 1%

The following variables are used as explanatory variables in the regression. AGE and AGE2 are defined as the age of the individual and the squared value of age respectively. GENDER is a dummy that takes the value 0 for a man and the value 1 if the person is female. MARRIED is a dummy that is one if the person is married and 0 otherwise. PRIMARY takes the value of 1 if the person's highest degree is primary schooling or less, it is 0 otherwise. SECONDARY is a dummy that is 1 for people with only secondary schooling level and 0 otherwise. SEARCH takes the value 0 if the person stated that he was not looking for a job at time t – 1 and it takes the value 1 if the person stated that he was looking for a job at time t – 1. SEARCH is assumed to have a positive effect on flows out of the agricultural sector and a positive effect on flows into the industrial and services sectors. HOURWEEK gives the number of hours that the person worked in his main job, i.e. industry or services, at time t – 1. FIRMSIZE is a categorical variable taking a value between 1 and 6 giving a measure of the size of the firm/farm where the person was employed at time t – 1. Firms/farms with the smallest number of employees have number 1; the largest firms/farms in terms of employees have number 6. HHMEMBER gives total number of household members and is an indicator of the size of the

household in which the person lives. FARMHH is a dummy that takes the value of 1 if the person is part of a household that has an individual farm and it is 0 otherwise. Finally, YEAR is a categorical variable that picks up possible effects over time. It is 2 for observations in the years 1994-1995; 3 for observations in the years 1995-1996; 5 for observations in the years 1997-1998; 6 for observations in the years 1998-1999.[2]

Table 2 shows the estimation results for the two models. The age variables (AGE and AGE2) indicate that both younger people and very old people are more likely to flow out of the agricultural sector. The stylised fact that young people are leaving the agricultural sector is contributing to the relatively high age structure of the agricultural sector (see Figure 1). The positive coefficient of GENDER shows that female workers seem to leave the agricultural sector more easily than their male counterparts. Married persons however are more likely to stay in agriculture. Education plays crucial role for agricultural labour flows.

SEARCH has a significantly positive coefficient. This confirms the hypothesis that individuals that actively search for a job are also more likely to get out of the sector.

HOURWEEK and FIRMSIZE have both significantly negative coefficients. Farmers that work more hours per week are more likely to stay in agriculture than for instance part-time farmers. This result is in line with the view that part-time farming is a stepping stone out of the agricultural sector and that part-time farming promotes the restructuring of the farm sector (Pfeffer, 1989; Roe, 1995; Weiss, 1999). People working on larger farms are less likely to flow out of the sector than agricultural labour in smaller farms.[3]

FARMHH has a significantly negative coefficient. This shows that people working in an individual farm are less likely to leave the agricultural sector than agricultural workers that have no links with family farming. Finally, YEAR shows that people were less likely to flow out of the agricultural sector in the earlier years when unemployment in the economy increased with the buffer role of agriculture.

The second model shows that human capital variables are the only determining factors behind whether people coming out of agriculture are finding a better job or are flowing into unemployment or retirement. Younger and better educated people are more likely to find a job in the industrial or services sector.

CONCLUSIONS

The micro-economic aspects and determinants of agricultural labour flows for Slovenia during transition are analysed. The set of explanatory variables consisting of individual personal characteristics, job characteristics, household characteristics and time dummy variables are linked with agricultural labor flows focusing on the role of human capital in this process.

One of the striking features of the Slovenian agricultural labour market is that the inflow of labour into agriculture is largely associated with the unemployment and retirement pools. The inflow of labour from industry and services into agriculture is rare. On the other hand, agricultural employment is still attractive for several people in the unemployment and retirement pools where agriculture serves the buffer role.

The analysis of the determinants of exit from agricultural employment clearly shows that human capital plays a crucial role for labour mobility, labour adjustment, and the determination of agricultural labour flows. The household heads living in larger households, having a larger farm size, and working full-time (more hours per week) in permanent jobs are more likely to stay in agricultural employment. Young, female and educated individuals are more likely entering into employment in non-agricultural, particularly service activities. There are remarkable circular flows of elderly and less educated persons between being employed in agriculture, unemployment and retirement pools. Small-scale and part-time farming only temporary provides employment opportunities. Investments in education and in human capital to improve quality of labor in agriculture and to increase mobility and flexibility of labor are the key issues in synergy reducing

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[2] Due to data limitations it was impossible to find matching observations between 1996 and 1997.
[3] These two stylized facts indicate that employment opportunities in non-agricultural sectors are likely to attract a process of farm restructuring leaving agricultural employment by employed in small and part-time farms leading to farm concentration.

labor market mismatch and improving labour mobility and labour flexibility as crucial for efficient labour adjustment at micro and sector level.

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