Survey-based Analysis of Determinants of Income Diversification in Agricultural Households of Slovenia

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Eine umfragegestützte Analyse von Bestimmungsgründen der Einkommensdiversifizierung in landwirtschaftlichen Haushalten Sloweniens

1. Introduction

Intensive reallocation of labour from agriculture to the non-farm sector has been a typical process of rural households over the last few decades. This is due to the interaction of production restructuring and technical progress in agriculture, which constantly reduces labour force requirements (MCNAMARA and WEISS, 2001). Adaptation strategies of agricultural households in terms of full use of its labour potentials and maintenance of a parity income level are mainly linked with various forms of income diversification (EUROSTAT, 2000).

Diversification of income sources has been a predominant feature of agricultural households in Slovenia (KOVAČIČ, 1995; SORS, 2002). In this respect, the situation has not changed in the first decade after the formal transition to a market economy. However, the pattern of income diversification has started to change. The decade 1991–2000 is characterized by a marked decrease (by 22.9 %) of households engaged in agricultural production, mainly on account of small-scale, marginal subsistence producers. Various forms of self-employment activities have expanded (SORS, 2002), partly as an answer to the transition-linked shocks on the non-farm labour markets (ORAZEM and VODOPIVEC, 1995) and partly as a strategy of targeting remunerative market niches (e.g. tourism). Despite its changing structure, empirical evidence shows that pluriactivity is about to keep its prevailing role in terms of labour supply on agricultural households in Slovenia (JUVANČIČ, 2002).

Despite the dominating role of pluriactive agricultural holdings in Slovenia, not much is known about their basic characteristics. There had been no empirical evidence about the total income situation and income structure of agricultural households. Similarly, no empirical evidence had existed about the prevailing aims and motives that determine the choice of employment strategy of agricultural households.

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Zusammenfassung

Die Arbeit untersucht die Frage der Einkommensdiversifikation innerhalb ländlicher Haushalte in Slowenien. Besonderes Augenmerk wird auf die Analyse jener Merkmale landwirtschaftlicher Haushalte gelegt, welche die Strategien zur Einkommensdiversifikation determinieren. Die für die Untersuchung verwendeten Daten stammen von einer Befragung von 120 ländlichen Haushalten. Empirische Einsichten in die Schlüsseldeterminanten der Einkommensdiversifikation bietet die Anwendung einer multiplen Diskriminanzanalyse.

Die Resultate bestätigen großteils die Hypothese, dass Haushaltsmitglieder in Verfolgung ihrer Einkommensziele zwischen verschiedenen Einkommensalternativen auswählen unter Berücksichtigung von (1) verfügbaren Produktionsmöglichkeiten, (2) Arbeitskraftpotential und den Möglichkeiten auf dem außerlandwirtschaftlichen Arbeitsmarkt zu konkurrieren, (3) individuellen Motiven.

Gestützt auf diese Resultate schlägt der Beitrag einige allgemeine Empfehlungen vor, wie ein differenzierter Rahmen für die ländliche Entwicklungspolitik zu konzipieren wäre, welcher diversifizierten Einkommens- und Tätigkeitsportfolios ländlicher Haushalte in Slowenien Rechnung trägt.

Schlagworte: Einkommensdiversifizierung, Arbeitsallokation, Berufsentscheidungen, außeragrarische ländliche Beschäftigung, multiple Diskriminanzanalyse.

Summary

The paper investigates the issue of income diversification among rural households in Slovenia. Special emphasis is given to the analysis of characteristics of agricultural households that determine their income diversification strategies. The data used in the analysis is based on a survey of 120 rural households. Empirical insight to the key income diversification determinants is provided by the application of a multiple discriminant analysis. The results largely confirm the hypothesis that household members, in pursuit of their income objectives, choose between various income alternatives with respect to (1) available production assets, (2) capacity of labour supply and abilities to compete on non-farm labour market and (3) individual motives and preferences. Based on these results, the paper gives some broad recommendations on how to develop a differentiated rural development policy framework that takes into account diversified income and activity portfolios of rural households in Slovenia.

Key words: income diversification, labour allocation, employment decisions, non-farm rural employment, multiple discriminant analysis.

for Diversification in the Rural Economy" provided an opportunity to tackle the above described research challenges (DAVIS, 2002). Primary data from 120 agricultural households in Slovenia were collected in fall and spring 2001/02. The questionnaire was based on the World Bank Living-Standard-Measurement-Survey questionnaire, but adapted to the topic at hand, namely determining the constraints and potentials of rural farm households as it concerns income diversification.

One of the objectives of this research was to determine whether agriculture is still the dominating income source and employer for the rural households in Slovenia. A separate study[1] has been carried out in order to obtain the corresponding empirical estimates of income and labour input of analyzed households. In this paper, we limit ourselves to the presentation of some main results of this study (chapter 2).

Another focus of the research (and the main research focus of this paper) was to provide empirical insight into the determinants that influence income diversification strategies of agricultural households. As pointed out by ZUREK (1986), motives and interests for income diversification in agricultural households differ and can be influenced by various determinants (e.g. transfer of excess family labour (disguised unemployment), satisfaction of income expectations, or personal preferences). An attempt to provide a statistically significant and theoretically sound explanation is made by the application of multiple discriminant analysis (MDA). The empirical scrutiny is focused on qualitative and attitudinal variables, which are supported by theory, but rarely tested in a formal way due to unavailability of data. The results bear also some policy implications, which are discussed in the final part of the paper.

2. Diversification of Income Sources in Agricultural Households in Slovenia

Estimation of total incomes and labour input from survey dataset has enabled to provide some empirical evidence on income diversification in agricultural households in Slovenia. Main results are briefly outlined in Table 1.

The importance of agriculture as an income source in the surveyed households is relatively low with about 30 %. Even in the households engaged in farming on a full-time basis, this share does not reach two thirds of the total household income. The labour input in agriculture measured as a proportion of full-time employment equivalent (FTE) surpasses half of total workload (almost 60 %), which infers particularly low labour productivity in agriculture. There are, however, marked differences in agricultural labour productivity between different types of rural households, where full-time agricultural households exhibit the most favourable results. Nevertheless, with respect to other income sources, labour productivity remains low also in their case.[2]

A majority of rural households combines their income with non-farm rural employment (NFRE). Thus, the acquired non-farm income represents 34.2 % of total income within the sample. The corresponding work input represents 33.9 % of total work input, inferring that labour productivity of non-farm wage work is relatively favourable.

Pensions and social transfers represent another important income source for most agricultural households with a 27 % share of the total income. In contrast to other income sources, where marked differences exist between the four household types presented in Table 1, there are no significant differences between household types with respect to the pensions and social transfers. Especially pensions often

Table 1:   Estimated income indicators by types of surveyed agricultural households
Tabelle 1: Geschätzte Einkommensindikatoren nach Typen befragter landwirtschaftlicher Haushalte

			Household types (with respect to their level of engagement in agriculture)[1]			
	Unit	Total	Full-time	Part-time	Self-employed	Abandoned agriculture
Total yearly income per household (2001)	US$[2]	15,657	15,245	14,421	20,602	12,773
Total yearly income per household member (2001)	US$	3,296	3,708	2,884	3,708	3,296
Total yearly income per FTE[3] (2001)	US$	6,180	7,829	5,356	6,180	7,005
Share of incomes from agriculture	%	28,6	61,0	19,9	32,0	0,0
Share of incomes from off-farm work	%	34,2	4,7	52,0	13,4	69,2
Share of incomes from self-employment	%	10,2	1,0	2,1	36,3	1,9
Share of incomes from other sources	%	27,0	33,4	26,1	18,3	28,9

Source: OBLAK et al. (2003)
Notes: 1) For a more elaborated description of household types, see Section 3.2.
         2) Original calculation in SIT (Slovene Tolar), avge. exch. rate 2001: 1 US-$ = 242.7 SIT).
         3) FTE = Full-time employment equivalent.

represent the most stable income source and, while invested in agricultural production, together with the above mentioned low opportunity costs of one's own work in agriculture, contribute the most towards the up keeping of agricultural production.

A supplementary self-employment activity outside the agricultural sector is a rather rarely used form of income sources.[3] Nevertheless, agricultural households with self-employment activities tend to earn the prevailing share of labour-related incomes from this income source (36.3 %). The corresponding work input in non-farm self-employment activities represents only about 23.2 %, thus, self-employment can be regarded as highly remunerative. However, since development of these activities is linked to successful targeting of (scarce) market niches and in most cases with considerable investment requirements, the scope of non-farm self-employment in rural households is likely to remain rather limited.

Results presented in Table 1 infer that there are no large differences in total income between the household types in question. Highest incomes are recorded in the households with self-employment activities. This, however, is attributed also to a relatively large household size which is characteristic for self-employed households in the sample. Differences in total income per household member are not distinct. This supports the hypothesis that agricultural households decide about the most favourable combination of income sources by considering their own set of preferences, driven by a tendency to acquire at least a parity income level. In the decision making process about their employment strategies, farming represents only one of the alternative sources of income.

3. Analysis of Income Diversification Determinants

3.1 Empirical Approach – Discriminant Analysis

The primary objective of this study is to construct a model which can be used to discriminate between the observed four groups of analyzed households. Rather than classifying the households in the analyzed groups, the focus of the research is descriptive, i.e. revealing major differences among them. To do so, multiple discriminant analysis was employed as the corresponding econometric tool.

The specification for the discriminant model is:

$$HH\_TYPE_i = \sum_{i}^{n} \alpha_i X_i \qquad (1)$$

where HH_TYPE is the classification type of the household i and X_i is a vector of the corresponding attributes which describe specific characteristics of the household i and which enter the analysis as independent variables, whose role is to discriminate between the types of households.

The SPSS stepwise discriminant analysis procedure was used in the analysis. The stepwise discriminant procedure selects those variables which add most to the explanation of variance between the group means using a backward elimination process. The backward elimination process begins with all the variables in the model and removes the variable that contributes least to the discriminatory power of the model at each step until all the remaining variables meet the F-test criterion to stay in the model.

3.2 Source of Data and Variable Description

The primary data is based on a survey of 120 rural households, carried out in 2001. The sampling frame represents four municipalities, which were chosen by a two-stage selection process using two sets of criteria: (i) the level of general economic performance of a region and (ii) conditions for agricultural production. The survey was conducted on a sample of 30 households per municipality. The sample was chosen mainly by stratified random sampling procedure, whereas in the cases of a low number of observations, quota sampling was used.

With regard to the prevailing labour input, households were stratified into four employment types: (1) households engaged in farming on a full-time scale (FT = full-time farms, N = 31); (2) part-time agricultural households with non-farm wage employment (PT = part-time farms, N = 47); (3) part-time agricultural households with non-farm self-employment (SE = self-employed farms, N = 22); and (4) households which have abandoned farming activities (AB = abandoned farms, N = 20).

The first two groups of households were differentiated by employment status of the core of the household (i.e. holder and his spouse or successor and his spouse). In households with full-time agricultural activities both reference persons were full-time employed on-farm and the farming activity represented the only income source of the core of the household. In part-time farms, one or more household members had permanent NFRE.

Part-time farms with self-employment were determined by the income criteria: at least 1 million SIT (appr. US$ 4,100) of yearly income had to be earned through self-employment activities.

Households with abandoned agricultural production were primarily selected by the criterion of limited disposal of agricultural land. Low importance and self-subsistence orientation of agricultural production was subsequently tested by calculation of agricultural incomes. Households were classified in that group if satisfying the criterion of generating a yearly agricultural income below 300,000 SIT (appr. US$ 1,200).

The survey attempted to provide the following data: (i) general socio-demographic information about household members; (ii) income sources, employment and labour input by economic activities; (iii) assets and agricultural output; (iv) record of non-farm revenues, other financial transfers (public transfers, remittances) and costs (e.g. loans).

3.3 The Variables

The above described four rural household types were employed as dependent variables of the MDA. The variables were split up into four categories (farm characteristics, household and labour input characteristics, personal characteristics and attitudes, and locational characteristics) to help selecting variables for the model. The degree of specificity within the set of candidate variables was broad. Due to the chosen sampling procedure, some general data extracted from secondary statistics (e.g. locational characteristics: distances, local labour market characteristics, population density) were exhibiting low variability and were therefore dropped from further analysis. Due to the inherent drawback of the data set, i.e. its inability to test for significance of locational and labour market characteristics,[4] the emphasis was put on the analysis of farm- and household-specific, personal and qualitative attributes.

Many variables had sound theoretical bases for inclusion in the predictive model. Numerous test runs of discriminant analysis with different combinations of variables were made in order to narrow the analysis to the most meaningful variables which provide a statistically and theoretically sound discriminating set. The ultimate hypothesis tested was that differences in employment strategies of rural households are determined first of all by available farm production assets and by the extent and qualification of one's own labour.[5] Personal motives and attitudes were also regarded as potential elements in the decision-making process. Descriptive statistics of variables included into MDA are presented in Table 2.

Some intuitive feeling for the results may be obtained by examining the above presented group means and standard deviations of variables employed (Table 2). As expected, notable differences in the agricultural income potential (expressed in European Size Units, ESU) between the surveyed rural households are observed. As described in greater detail in Section 2, contrary to farm assets, differences in total income are not so distinctive. The extent of available family labour tends to be the highest in part-time farm households with non-farm self-employment.

With respect to the educational attainment and the corresponding competitiveness on the (non-farm) labour market, differences can be perceived between the full-time agricultural households, which tend to exhibit the lowest educational level, and the others. As expected, this is reversed in the case of reported formal vocational training in agriculture, where full-time agricultural households are surpassing the others by a wide margin.

Table 2: Descriptive statistics for selected characteristics of surveyed households
Tabelle 2: Beschreibende Statistik für ausgewählte Merkmale der befragten Haushalte

Item		Total Means (SD) N = 120	Household types			
			FT Means (SD) N = 31	PT Means (SD) N = 47	SE Means (SD) N = 22	AB Means (SD) N = 20
Economic size of farms	ESU	10.71	18.15	8.39	14.09	0.89
(in European Size Units, ESU)		(11.05)	(13.17)	(6.23)	(12.69)	(0.76)
Reported attitude towards agricultural work	ATT	2.14	1.74	2.13	1.91	3.05
(scale 1–4)		(1.07)	(1.03)	(1.06)	(1.06)	(0.60)
Reported importance of income motives	A_YM	4.18	4.87	4.36	4.50	2.30
in agriculture (scale 1–5)		(1.35)	(0.34)	(1.07)	(0.80)	(1.75)
Reported importance of personal motives	A_PM	4.43	4.61	4.51	4.63	3.75
in agriculture (scale 1–5)		(0.96)	(0.72)	(0.86)	(0.58)	(1.48)
Number of household members	HH_M	4.68	4.00	4.98	5.72	3.85
		(1.79)	(1.71)	(1.58)	(1.93)	(1.53)
Overall labour input of household members	FTE	2.53	2.11	2.75	3.27	1.83
(in FTE equivalents)		(0.98)	(0.70)	(0.83)	(1.04)	(0.87)
Total yearly income per household member	Y_HM	1.00	1.23	0.87	1.03	0.93
(in million SIT)		(0.59)	(0.86)	(0.45)	(0.48)	(0.39)
Highest level of educational attainment in household	EDUC	3.63	3.16	3.68	3. 64	4.25
(scale 0-9)		(1.00)	(1.10)	(0.89)	(0.49)	(1.16)
Highest level of agricultural vocational qualifications	AG_TR	0.85	3.29	0.64	1.00	0.50
in household (scale 0-5)		(1.21)	(1.39)	(1.07)	(1.11)	(1.15)
Reported importance of income motives in	OF_YM	3.83	3.48	4.06	3.55	4.10
off-farm work (scale 1–5)		(1.00)	(1.31)	(0.67)	(1.06)	(0.85)
Reported importance of personal motives in	OF_PM	2.85	2.71	2.95	2.59	3.10
off-farm work (scale 1–5)		(1.14)	(1.40)	(1.04)	(1.05)	(1.02)
Reported attitude towards self-employment	SE_ATT	1.76	1.65	1.88	1.41	2.04
(scale 1–4)		(0.68)	(0.56)	(0.71)	(0.58)	(0.73)
Reported importance of income motives in	SE_YM	3.90	3.68	3.85	4.05	4.20
self-employment (scale 1–5)		(0.79)	(0.87)	(0.78)	(0.72)	(0.70)
Reported importance of personal motives in	SE_PM	2.51	2.48	2.40	2.68	2.60
self-employment (scale 1–5)		(1.13)	(1.06)	(1.21)	(1.13)	(1.10)

Source: Own calculation. Data from EC-PHARE ACE Project No. P98-1090-R
Note: FT = full-time farm; PT = part-time farm with wage employment; SE = part-time farm with non-farm self-employment; AB = rural household which has abandoned farming

There are also some marked differences in the reported attitudes towards agricultural and NFRE. Attitude towards agricultural work remains positive in all cases except in the case of households, which have already abandoned farming. Although motives for agricultural production are relatively highly ranked (with the same exception as in the previous case), income motives are given priority to the personal motives only in the case of full-time agricultural households. Reported motives for NFRE are diametrical to the previous ones: full-time, together with self-employed agricultural households share a relatively reserved attitude to this employment choice. Contrary to the motives for agricultural production, personal motives in none of the observed household types surpass the income-related ones. As expected, the most positive attitude towards non-farm self-employment is expressed by the households already engaged in that activity. Similarly as in the case of NFRE, income motives widely surpass the personal motives for dealing with self-employment activities.

The pooled within-group correlation matrix indicates a low correlation between the predictors in most of the cases. There are however some outliers. Some positive correlation (0.568) exists between the income per household member and the economic size of farms, which is probably due to the fact that the full-time farms analyzed are relatively large, at least in Slovene terms. There is also some positive correlation between the highest level of agricultural vocational qualification in the household and the economic size of a farm (0.423), between the educational level and agricultural vocational qualification (0.422) and between the number

of household members and available labour supply in the household (0.416). The results should therefore be regarded with some caution, even though the problem of multicollinearity is not very distinctive.

4. Empirical Results

Table 3 provides the overall results and indicates that all three discriminant functions are significant at 95 % or higher, as indicated by Wilk's λ and χ^2 statistics and therefore significantly discriminate among the analyzed four groups of rural households. Overall, function 1 accounts for the prevailing share of the variance (72.4 %), so the first function is likely to be superior. This is reflected also in the values of the canonical correlation, from which we can infer that 64.4 % of the variance can be explained by this function, whereas the corresponding values for functions 2 and 3 are 33.4 % and 16.2 %, respectively.

In the final version of MDA, only predictors which are significant at 90 % or higher were included. Table 4 presents the Wilk's λ statistics and the univariate F-ratios of

variables included in the model. As it is revealed by the presented values, all predictors employed significantly differentiate between the observed employment types of agricultural households.

However, due to the caveat that the resulting F-values should only serve as a guide in determining the relative significance of each variable in the discriminant function (MALHOTRA and BIRKS, 2000), relative importance of individual predictors in discriminating between the groups is to be discussed in greater detail by examining the results of the stepwise estimation procedure, absolute magnitude of the standardized function coefficients and structure matrix (Table 5).[6]

Results of the stepwise estimation procedure suggest that seven initially considered variables contribute only little to the classification of the households into four different groups. These variables relate to reported attitude towards agriculture, importance of income motives in off-farm- and self-employment, importance of personal motives in agriculture, level of agricultural vocational qualifications and total incomes per household member. Calculated potency indices (HAIR et al., 1998) suggest that the highest discrim-

Table 3:   Characteristics of discriminant functions
Tabelle 3: Eigenschaften der Diskriminanzfunktionen

| Function | *Eigenvalue* | Percent of variance | | Cannonical correlation | Wilk's λ | χ^2 | df | Significance |
		Function	Cumulative					
1	1.269	74.3	74.3	0.748	0.300	137.848	15	0.000
2	.354	20.7	95.0	0.511	0.681	44.053	8	0.000
3	.085	5.0	100.0	0.280	0.921	9.382	3	0.025

Source: Own calculation. Data from EC-PHARE ACE Project No. P98-1090-R

Table 4:   Test of equality of group means
Tabelle 4: Test auf Gleichheit der Gruppenmittel

Independent variables	Wilk's λ	F-value	Significance
ESU	0.714	15.462	0.000
ATT	0.834	7.688	0.000
A_YM	0.589	26.966	0.000
A_PM	0.895	4.551	0.005
FTE	0.736	13.844	0.000
Y_HM	0.939	2.506	0.063
EDUC	0.876	5.475	0.001
AG_TR	0.936	2.636	0.053
OF_YM	0.920	3.352	0.021
SE_ATT	0.904	4.121	0.008
SE_YM	0.948	2.135	0.100
HH_M	0.852	6.696	0.000

Source: Own calculation. Data from EC-PHARE ACE Project No. P98-1090-R

inatory power can be attributed to the stated importance of income motives in agriculture (A_YM), followed by, but with already significantly less discriminatory power, by the economic size of farm (ESU) and overall labour input of household members (FTE). The remaining two variables, i.e. the highest level of educational attainment in the household (EDUC) and reported attitude towards self-employment (SE_ATT) have brought even less to the classification of households into four groups.

The standardized coefficients indicate a large discriminatory power of the economic size of a farm and income motives related to farm work. A similar conclusion is reached by an examination of the structure matrix. Variables associated with the scale and intensity of agricultural production, attitudes and motives related to farm work are associated primarily with function 1. Characteristics, which

Table 5:   Standardized discriminant coefficients and structure matrix
Tabelle 5: Standardisierte Diskriminanzkoeffizienten und Strukturmatrix

Independent variables	Standardised discriminant coefficients			Structure matrix		
	Function 1	Function 2	Function 3	Function 1	Function 2	Function 3
ESU	0.482	-0.476	0.471	0.527*	-0.320	-0.362
ATT[a]	–	–	–	-0.132	0.147	-0.058*
A_YM	0.631	0.096	0.654	0.725*	0.037	-0.598
A_PM[a]	–	–	–	0.262*	0.166	0.143
FTE	0.250	0.900	-0.176	0.255	0.879*	-0.178
Y_HM[a]	–	–	–	0.176	-0.323*	-0.258
EDUC	-0.470	0.201	0.105	-0.306*	0.244	-0.159
AG_TR[a]	–	–	–	0.150*	-0.050	-0.018
OF_YM[a]	–	–	–	0.000	0.123	0.146*
SE_ATT	-0.353	-0.058	0.643	-0.231	-0.072	0.660*
SE_YM[a]	–	–	–	-0.061	0.149	0.188*
HH_M[a]	–	–	–	0.157	0.298*	-0.192

[a] Variables removed from the stepwise discriminant model
* Largest absolute correlation between the variable and discriminant function
Source: Own calculation. Data from EC-PHARE ACE Project No. P98-1090-R

are predominantly associated with function 2, are dealing mainly with available labour potential of the household. function 3 is determined predominantly by personal motives and attitudes linked with NFRE.

We have found (see Table 5) that the discriminant functions are able to distinguish between the dependent variables and that there are unequal mean values between the analyzed household types. A check of whether there are indeed differences between the function means for household types is shown in Table 6, where we can see that none of the group centroids are equal in value. Thus, the obtained discriminant functions discriminate between household types. Function 1 clearly separates full-time farm households from the others. Function 2 further makes distinction between self-employed and remaining two types of households. Ultimately, function 3 makes the final distinction between part-time farm households with wage employment and part-time farm households with non-farm self-employment.

In validating the MDA results, we need to compare the hit ratio with the predictions carried out. In this respect, we have compared the hit ratio (presented in Table 7) with the proportional chance criterion, which is calculated by summing the squared proportion that each group represents of the sample, which adds up in this case to 0.282. Based on the requirement that model accuracy be 25 % better than the chance criteria and taking into account that our hit ratio (65.0 %) markedly exceeds this value, we can conclude that the MDA model is better at discriminating between the household types as the chance model. This can be additionally confirmed by the corresponding Press's Q statistic (Q = 102.4), which largely exceeds the critical value (6.63). The matrix with classification of cases with respect to the results of the discriminant function reveals that the dis-

Table 6:   Functions at group centroids
Tabelle 6: Funktionen bei den Gruppencentroiden

Household types	Function 1	Function 2	Function 3
FT	0.969	-0.848	-0.014
PT	-0.027	0.373	0.307
SE	0.775	0.682	-0.464
AB	-2.289	-0.313	-0.191

Source: Own calculation. Data from EC-PHARE ACE Project No. P98-1090-R
Note: FT = full-time farm; PT = part-time farm with wage employment; SE = part-time farm with non-farm self-employment; AB = rural household which has abandoned farming

Table 7:   Classification of cases according to the results of the discriminant function
Tabelle 7: Klassifizierung der Fälle gemäß Ergebnissen der Diskriminanzfunktion

		Predicted group membership				Total
		FT	PT	SE	AB	
Original group membership	FT	24	7	0	0	31
	PT	8	32	3	4	47
	SE	3	11	8	0	22
	AB	0	6	0	14	20

Source: Own calculation. Data from EC-PHARE ACE Project No. P98-1090-R
Note: FT = full-time farm; PT = part-time farm with wage employment; SE = part-time farm with non-farm self-employment; AB = rural household which has abandoned farming

criminant functions were fairly accurate in predicting group membership, with the exception of the part-time farm households with non-farm self-employment, for which discriminant functions tend to provide rather low estimates. Nevertheless, since the primary use of the analysis is description of household types by identifying characteristics which discriminate one type from another, a somewhat lower hit ratio of self-employed households is not seen critical.

5. Discussion and Conclusion

The results of the study suggest that discriminant analysis can be used to identify characteristics associated with different employment types of rural households in Slovenia. The results confirm the hypothesis implied by the income model results (OBLAK et al., 2003) that household members, in pursuit of their income objectives, choose between various income alternatives with respect to (i) available own production assets, (ii) capacity of own labour supply and abilities to compete on the off-farm labour market and (iii) own motives and preferences.

Discriminant functions reveal that available assets for agricultural production and the corresponding income-related motives play the strongest role in decision of households for full-time engagement in agriculture. In contrast to this, self-employed households are driven primarily by the motives related to household size and the corresponding extent of own labour potential. This might imply that, while employment potential in agriculture in the (prevailingly small-scale) farm size structure in Slovenia rarely exceeds one full-time equivalent (JUVANČIČ, 2002), self-employment tends to be a more efficient strategy in provision of employment of household members.

Part-time farm households with wage employment and households which have abandoned farming represent the second pole. Due to poorer production potentials in agriculture, their income strategies are mainly (and in the case of households with abandoned agricultural production exclusively) linked with non-farm employment. Personal preferences appear to have a more distinctive role in decision-making about off-farm employment.

From the aspect of practical applicability of results, one could point out their importance in effective planning and implementation of structural policy measures related with agriculture and rural development. As accentuated by AHEARN et al. (1985), the probability of effective state intervention in any economic activity is higher, when founded upon a thorough acquaintance with the characteristics and problems linked to that activity. This holds true also for structural conditions and labour supply in Slovene agriculture: structural changes are rapid and intensive (SORS, 2002), whereas their perception (which is conditional upon gathering and processing of statistical data) is, as a rule, belated. The greater the delay, the greater the danger of failures in planning and implementing of state interventions (in this case in agricultural structural and regional policies).

In a long-term perspective, it would be reasonable to stimulate development of economic activities which converge towards a sustainable improvement of the employment structure. Target groups of these activities would have to be represented by both, agricultural households, to which agriculture and related activities represent the only or predominant income source, as well as by households whose income strategies are mainly oriented towards non-farm work. In the search for possible solutions for active members of farm households on the rural regional labour market, there are no universal and no short-term solutions. For full-time and self-employed agricultural households, the objectives should be linked to a greater extent with increased labour mobility and higher competitiveness of own agricultural and self-employment activities. For households engaged in agriculture merely on a part-time or subsistence basis, the objectives should be oriented more towards increased own competitiveness on non-farm labour market and up-keeping of agricultural production in correspondence with own personal and wider social goals (e.g. safeguarding the environment, preservation of cultural landscape).

Annotations

[1] Reader interested in structure and estimation procedure of the total income model, or merely in obtaining more elaborated information of the results achieved, is encouraged to consult ERJAVEC et al. (2002). Results can also be obtained from the authors of the present paper upon request.

[2] Low opportunity costs of own work in agriculture are regarded as a key comparative advantage of family farms versus other forms of labour organization in agriculture (SCHMITT, 1997).

[3] According to the results of the last Census of Agriculture (2000), there are about 6 % of farms with self-employment activity in Slovenia (SORS, 2002).

[4] Some empirical evidence of the impact of locational and local labour market characteristics on occupational choice in agricultural households in Slovenia can be found in JUVANČIČ (2002).

[5] Physical assets, natural resource assets as well as human assets are among the assets described in the livelihood asset pentagon of CARNEY (1998) and determine household livelihood. Household composition and size determine livelihood vulnerability.

[6] The results need to be regarded with some caution given the above mentioned possible multicollinearity between individual predictor variables.

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