

## COSTS AND INCOMES OF FAMILY FARMS IN MACEDONIA IN A FADN COMPATIBLE ACCOUNTING AND INFORMATION SYSTEM

MARTINOVSKA-STOJČESKA A., DIMITRIEVSKI D., ERJAVEC E.

### Abstract

*No consistent farm income data on micro level is available in Macedonia. The Farm Accountancy Data Network (FADN) methodology, being the only standardised and harmonised farm accountancy system in EU, was applied and tested on a sample of agricultural holdings. In addition, data on quantity of inputs and applied technology, as well as occurrence of non-agricultural income were recorded. The structure and farm income of Macedonian farms in 2002–2004 was presented upon a sample of farms belonging to different economic sizes and farm types. The results were analysed and interpreted in EU context, by comparison with a panel of EU member countries. The size of Macedonian farms in economic terms (5.9 ESU) was five times smaller than the EU-25 average (32.7 ESU). The gross farm income of the Macedonian sample was 5 500 EUR/farm, representing about 15% of what an average EU farm generated at that level. The family farm income reached 4 100 EUR, four times lower than the EU-25 average. Due to differences in income will the EU-accession pose major challenges to Macedonian farmers, but also expectedly bring improvement of the income situation of commercial-orientated farms. Very little support was available to Macedonian farms until 2004, thus the farm income includes no subsidies, in contrast to the EU farms. The benefits of farm income data on micro level will contribute to the creation and evaluation of the agricultural policy, as well as the measurement of the recently launched national policy support schemes and the imminent pre-accession funds.*

**Key words:** Macedonia, family farms, costs, income, FADN

### INTRODUCTION

The agricultural sector in Macedonia participates with 11% in the GDP (Ministry for Agriculture, Forestry and Water Management, 2006) and is traditionally one of the most important in the economy. Coupled with the processing industry, the share of the agri-food sector in the GDP increases to about 17%.

The sector is characterized by a large number of small and heterogenic holdings. Preliminary data from the 2007 Agricultural Census indicate 192 378 agricultural holdings, which cultivate 264 338 ha. According to this source, the average Macedonian farm utilises agricultural area of as low as 1.37 ha (87.5% of all holdings cultivate less than 10 ha of utilised agricultural area). More than 80% of the land is owned or rented by family farms (State Statistical Office, 2008). The major crops are cereals, early vegetables, grapes and fodder crops; as for the livestock production, dairy farming and sheep breeding are the most significant (State Statistical Office, 2008).

Macedonia has been an EU candidate country since 2005. The EU approximation process will have an impact on the Macedonian agriculture; prices and trade flows will change, and that will inevitably have an effect on the farm income.

Farm data available on micro level is scarce. Official statistical sources in Macedonia provide insufficient quantity and quality of farm level data. The farmers in Macedonia are not obliged to keep farm books or conduct farm accounting; hence, they do not have accurate farm income calculations. Farm records can

provide valuable information which can indicate the profitability, support the decision-making process and facilitate the farm business planning. It is generally assumed that the introduction of accounting will improve the farm management and produce better farm performance (Luening, 1989).

Furthermore, policymakers and other stakeholders involved in agriculture will get greater efficiency and effectiveness in their decisions when they base the farm income analysis on accounting-derived information of the farms (Argiles, 2001). The policies operated by the EU, particularly the CAP, require reliable statistical information on the farmers' economic situation. A central requirement of a policy as complex as the CAP is data on the incomes of farmers, which can be used to assist the policy design and at the same time be a part of the monitoring of its performance (Hill, 1991). Thus, a functional farm accountancy data system can be useful for the decision-makers in creating adequate agricultural policy, but also in validation of the results from the appropriate measures and the integration effects. In addition, it can support the advisory and extension segment, as well as the research and academic community.

The objective of this paper is to apply and test the EU-FADN methodology on a sample of agricultural holdings in Macedonia. Additionally, the structure and income of the Macedonian farms are compared to the EU countries by using the harmonised methodology. This is the first attempt to fill in the gap of lacking farm data on micro level in Macedonia and

functionally interpret them in EU context. With the EU pre-accession in mind, the paper stresses the availability of farm data as an important tool for the national policy support schemes and the pre-accession funds.

The paper starts with an overview of the applied FADN methodology, followed by explanation of the additional methods used. Further, the sample is described along with the classification of the farms. Then we provide presentation of the Macedonian results of the farm income indicators. These results are compared with farm cost and income data from EU countries. The main conclusions are drawn in the end.

## MATERIAL AND METHODS

### Farm accountancy data network (FADN)

The Farm Accountancy Data Network was established in 1965 as an information tool for collecting accountancy data from agricultural holdings in the European Union (EEC/79/65). FADN was primarily set up to support the creation and assessment of the Common Agricultural Policy (CAP). The system is a unique instrument for evaluating the income of agricultural holdings providing information about the economic conditions on European farms.

FADN is the only harmonised and standardised source of data obtained from a sample of individual farms across all member states. Given the common methodology, the network provides comparable data on a European level. The field of observation of FADN are commercial farms. A minimum European Size Unit is established in each member state to define the commercial farm threshold. The sample is stratified by region, farm size and type of farming.

The farm income indicators in FADN are derived from the income statement; the subtraction of the total intermediate consumption (SE275), production and input subsidies (SE605) and taxes (SE390) from the total output (SE131), provide the gross farm income indicator (SE410). The depreciation costs are further subtracted in order to reach the farm net value added indicator (SE415). Finally, the family farm income (SE420) is produced by deducting the external factors – wages, rent and interest paid (SE365) from the farm net value added.

### Methods used in addition to FADN

FADN data on EU level still provide limited analysis in some respects; one of the major issues is that the FADN data completely lack information in terms of quantity of inputs used by the farm for each farm enterprise and the applied technology (Paris and Arfini, 1999). In this respect, analytical gross margin budgets were calculated for each farm enterprise, being any coherent portion of the general input-output structure of the farm business

that can be separated and analysed as a distinct entity (Eidman et al., 2000).

FADN does not cover the non-agricultural income of the farm household; however, having in mind the structure of Macedonian farms, the off-farm income as an important source of revenue was therefore included into the survey questionnaire.

A range of alternatives should be considered for regular calculation (Hill, 1991), one of them being the net profit margin: Family Farm Income (SE420)/Total Output (SE131).

### Selection of the sample

A detailed in-depth farm survey was conducted on 50 representative farms in 4 regions throughout the country (Skopje, Bitola, Negotino and Strumica). The selection of farms was based on the National Extension Agency farms sample.<sup>1</sup> The regional coverage, major farm activity and minimum of 1 ha of utilised agricultural area were set as farm selection criteria. We should note that the sample is not statistically representative for all commercial farms in the country.

The data derived from the survey were processed using an applicative model for farm business analysis, specifically developed for this purpose in Microsoft Excel in accordance with FADN methodology. The data from the Macedonian farms were collected for the period of 2002–2004. The year 2004 was taken as the most suitable year for the EU-member states comparison, since it was the first year that included EU-25 countries in the FADN database.

The EU countries included in the comparison panel were selected upon three criteria: new member states that joined the EU in 2004 (e.g. Slovenia); bordering countries, with similar agro-climatic conditions (e.g. Greece); and EU countries with intensive agricultural production (e.g. The Netherlands).

### Classification of Macedonian farms according to FADN

According to the FADN regulative (78/463/EEC), classification of farms in the European Union is principally done according to two major criteria: economic size of the agricultural holding and type of farming.

The economic size of the farm is determined as the value of its total farm standard gross margin, expressed as a Community unit of measurement, the European Size Unit (ESU), currently estimated at 1 200 EUR. The standard gross margin (SGM) is the balance between the standard value of the output and the standard value of certain direct specific costs, calculated in average for a period of 3 to 5 years. The SGM is an economic criterion expressed

<sup>1</sup> The Farm Monitoring System (FMS) is a survey conducted by the National Extension Agency of the Republic of Macedonia. This survey includes around 450 representative farms countrywide with basic farm economics indicators.

in monetary terms, either per hectare of utilised agricultural area in the case of crop enterprises or per head of livestock in the case of livestock farming.

The size structure of agricultural holdings in Macedonia is very unfavourable, as it is reflected in the sample (see Table 1); almost one-half of the surveyed holdings belong to the economic class of very small farms (less than 4 ESU, i.e.  $SGM < 4\,800$  EUR). In the class of small farms, ranging from 4 to 8 ESU belongs 37% of the surveyed farms. The economic class of medium-low farms (8–16 ESU) is represented by 14% of the holdings, while only 4% belong to the class of medium-high sized farm ( $> 16$  ESU).

The type of farming is the other classification criterion, defined as the production system of a holding which is characterised by the relative contribution of different enterprises to the holding's total standard gross margin. The general type of farming level (TF8) is applied in this paper.

The largest share of surveyed farms in Macedonia is taken by dairy producers (27%), followed by vegetable and grape producers (each 18%), grazing livestock – sheep and mixed farms (each 12%), and finally the fruit and field crops producers (Table 2).

## RESULTS

### Macedonian sample

Using the farm economic size classification, the highest level of farm income (gross farm income, farm net value

added and family farm income) was attained by medium-high farms. This is logical since the highest total output was also achieved by this group, and the level of total intermediate consumption followed a declining input/output coefficient. Subsequently, the profitability is the highest for this group, as the net profit margin reaches 50.6%. Lowest profitability is noted in the very small farms group, reaching 21.7% margin.

The level of non-agricultural income (pensions, social security, off-farm salary) is mostly elevated on very small farms, and declines proportionally with the economic farm size. This leads us to the assumption that smaller farms are more dependent on supplementary sources of income and most likely practicing farming as part-time activity, while larger farms are more commercialised.

When looking at the farm income by type of farm classification, the highest income generating farms are cereal farms, vegetable farms and grape farms. This result was somehow anticipated for the vegetable, grape and dairy farms, since generally vegetables and grapes are achieving high gross margins per capacity unit. The cereal farms that participated in the survey, besides from product sales, showed high output value from providing machinery services to other farmers (harvesting and baling), so their farm income was higher than expected. The dairy farming in Macedonia attained average income, which comes as no surprise since the breeds are mostly domestic or mixed; the milk yield is low and the feed input value was high.

**Tab. 1:** Average value per economic size groups of Macedonian farms included in the survey 2002–2004 (EUR)

Average value per agricultural holding	FADN code	Very small farm (< 4 ESU)	Small farm (4 < 8 ESU)	Medium-low farm (8 < 16 ESU)	Medium-high farm (> 16 ESU)	Average
Structure in sample	%	45	37	14	4	–
Total UAA (ha)	(SE025)	2.9	4.5	6.1	7.5	4.2
Total livestock units	(SE080)	3	4	7	3	4
Total output crop production	(SE135)	2 282	5 489	9 527	22 685	5 271
Total output livestock production	(SE206)	2 307	4 579	10 831	3 869	4 384
Other output	(SE256)	43	72	239	407	95
<b>Total output</b>	<b>(SE131)</b>	<b>4 603</b>	<b>10 206</b>	<b>20 599</b>	<b>27 590</b>	<b>9 788</b>
Total specific costs	(SE281)	1 896	3 389	6 552	6 229	3 261
Total farming overheads	(SE336)	907	1 568	3 075	4 511	1 592
Total intermediate consumption	(SE275)	2 803	4 957	9 627	10 740	4 854
<b>Gross farm income</b>	<b>(SE410)</b>	<b>1 800</b>	<b>5 249</b>	<b>10 972</b>	<b>16 850</b>	<b>4 934</b>
Depreciation	(SE360)	520	887	1 450	2 298	854
<b>Farm net value added</b>	<b>(SE415)</b>	<b>1 267</b>	<b>4 349</b>	<b>9 492</b>	<b>14 541</b>	<b>4 065</b>
Total external factors	(SE365)	268	506	899	585	456
<b>Family farm income</b>	<b>(SE420)</b>	<b>999</b>	<b>3 843</b>	<b>8 593</b>	<b>13 955</b>	<b>3 609</b>
<b>Net profit margin (%)</b>	<b>(SE420/131)</b>	<b>21.7</b>	<b>37.7</b>	<b>41.7</b>	<b>50.6</b>	<b>36.9</b>
Off-farm income	OFI	1 884	1 142	465	–	1 339

**Tab. 2:** Average value per type of farm in Macedonia, survey results 2002–2004 (EUR)

Farm type (TF8)	% in sample	Total output (SE 131)	Gross farm income (SE410)	Farm net value added (SE415)	Family farm income (SE420)
A (Field crops)	4	12 058	7 378	6 325	4 845
B (Horticulture)	18	11 103	6 084	4 759	4 393
C (Wine)	18	8 488	5 162	4 239	4 201
D (Permanent crops)	10	4 092	2 210	1 569	1 337
E (Milk)	26	11 860	5 107	4 416	3 760
F (Grazing, sheep)	12	9 766	4 315	3 555	2 953
H (Mixed)	12	8 714	4 405	3 674	3 239
Average	–	9 788	4 934	4 065	3 609

### Comparison with EU

The agricultural holdings in the European Union are on average more than five times the size of the agricultural holdings in Macedonia. The average economic size of EU farms in 2004 was 32.7 ESU, while the Macedonian match was determined to be 5.9 ESU.

In terms of engaged labour, the Macedonian farm averagely employs two annual working units (AWU), which is even higher than the EU-25 average of 1.7 AWU (ranging from 1.2 AWU in Greece to 2.4 AWU in The Netherlands). We have to consider that many operations on Macedonian farms, such as sorting and grading of vegetables or even milking of cows, are performed manually and are very labour consuming. The labour productivity and technological level are lower on Macedonian farms, as compared to the EU.

In most of CEEC countries that joined the EU in 2004, for instance Slovenia, the production potential of family farms in the pre-accession period was low, in particular due to the limited land and capital resources (Erjavec et al. 2003). In addition, subsistence farming was largely practiced, which is to a large extent corresponding to the Macedonian situation.

The utilised agricultural area (UAA) per agricultural holding shows high variability among EU member countries, ranging from 6.3 ha in Greece, up to 93.3 ha in Sweden, with EU average of 34.3 ha in 2004. The average derived from the Macedonian sample farms is 4.2 ha UAA/farm, which is higher than the official statistical mean of 1.37 ha per farm (State Statistical Office, 2007), meaning that the farms included in the sample were slightly larger than the average.

The livestock units per agricultural holding in the EU in average reach 29.0. The Macedonian average equals 3.8 LU/holding, which is logical when compared to the statistical information that 86.4% of the farms have 1-5 heads of cattle [Brandt (2006)]. Macedonian farms are lagging behind the EU average wheat yields; according to the research in 2004 the Macedonian average is 3.8 t/ha (the official statistics provides a figure of 3.5 t/ha for the same period), as compared to the average of 6.7 t/ha in EU-25. In respect to cow milk, the research results demonstrated a mean of 4 557 l per head (according to the official statistics, this average is much lower – 2 362 l/head), compared to the EU average of 6.908 l/head.

**Tab. 3:** Structure of agricultural holdings and major indicators in 2004

	Economic size (ESU)	Annual working units	Utilised agricultural area – UAA (ha)	Rented UAA (ha)	Livestock units (LU)	Wheat yield (kg/ha)	Cow milk yield (l/head)
FADN code	(SE005)	(SE010)	(SE025)	(SE030)	(SE080)	(SE110)	(SE125)
Greece	9.4	1.2	6.3	2.5	4.1	3 158	4 521
France	75.9	1.9	73.7	61.1	60.6	7 655	6 899
Hungary	17.1	1.9	49.4	33.0	21.2	5 278	6 747
Italy	25.4	1.4	16.8	6.3	14.2	5 657	6 817
Netherlands	127.2	2.4	31.2	12.6	99.6	8 607	8 283
Poland	9.4	1.8	15.7	4.0	12.7	5 463	4 432
Sweden	55.7	1.4	93.3	45.7	54.0	5 952	8 829
Slovenia	7.3	2.0	12.7	4.3	13.5	4 648	5 576
<b>EU-25</b>	<b>32.7</b>	<b>1.7</b>	<b>34.3</b>	<b>18.0</b>	<b>29.0</b>	<b>6 676</b>	<b>6 908</b>
<i>Macedonian sample</i>	<i>5.9</i>	<i>2.0</i>	<i>4.2</i>	<i>1.6</i>	<i>3.8</i>	<i>3 791</i>	<i>4 557</i>

Source: Survey and own calculations based on the FADN public database



It is interesting to compare the specific costs of Macedonian and EU farms on two levels i.e. on agricultural holding level or 1 ha UAA level. When the total amount of average specific costs is analysed per holding, then the Macedonian results (3 214 EUR) are close to those of the Greek farms (4 008 EUR) and Slovenian farms (4 894 EUR), but at the same time are almost seven times lower than the EU average (21 558 EUR). This situation has been anticipated, since the size of agricultural holdings is the smallest in these countries.

The Macedonian farms had higher average values of specific costs per one hectare of UAA (780 Euro/ha) compared to the EU-25 average (628 Euro/ha). The major contributors to this phenomenon were the high livestock feed costs, due to the high input prices and often imported inputs.

Using a survey supported by harmonised methodology provided grounds for processing comparable data. The gross farm income at Macedonian holdings is twice as low as compared to some of the countries that joined the EU in 2004 (such as Poland and Slovenia) and compared to the EU countries that apply high-end technology and intensive production is more than 20 times lower (for instance, The Netherlands). An issue relevant to the gross

farm income is the production or input support evident through the subsidy levels. No subsidies were provided to the farmers in Macedonia in 2004; quite the opposite, the EU farmers received various types of support, which had an impact on the income levels.

It is evident that at the Macedonian holdings the difference between the various income indicators is very small, unlike the EU countries. This is explained by the lower depreciation costs (little and often depreciated machinery) and avoidance or exemption of land taxes payment. Moreover, many of the farmers would use unemployment social and health benefits. Therefore the margin between the gross farm income (SE410) and the farm net value added (SE415) derived from the Macedonian sample results is inconsiderable.

The edge between the farm net value added (SE415) and the family farm income (SE420) at the sample farms is again rather small – around 10%, and is basically caused by the low level of costs for external factors (rent paid, wages paid and interest paid). In contrast, the EU average farm net value added is almost double than the family farm income.

This situation can be explained to certain extent: land rent is rarely paid or is quite insignificant in Macedonia. Family labour is dominant and occasionally seasonal

**Tab. 4:** Comparison of the specific costs per holding in 2004 (EUR)

	Total specific costs (SE 281)	Seed and seedlings (SE 285)	Plant nutrition (SE 295)	Plant protection (SE 300)	Other crop specific costs (SE 305)	Livestock feed (SE 310– SE 325)	Other livestock spec. costs (SE 330)
<b>Average per holding</b>							
Greece	4 008	547	935	678	219	1 324	104
France	38 096	4 988	7 457	6 837	1 052	8 422	2 506
Hungary	22 836	2 689	2 733	2 888	857	4 311	1 222
Italy	17 157	2 352	1 679	1 607	1 955	6 239	636
Netherlands	95 751	21 142	4 264	5 332	12 720	13 617	9 873
Poland	8 079	819	1 329	611	336	1 008	266
Sweden	55 279	3 913	6 992	2 714	2 622	24 649	4 950
Slovenia	4 894	421	517	286	415	1 674	639
<b>EU-25</b>	<b>21 558</b>	<b>2 627</b>	<b>2 885</b>	<b>2 285</b>	<b>1 312</b>	<b>5 542</b>	<b>1 771</b>
<i>Macedonian sample</i>	<i>3 214</i>	<i>288</i>	<i>389</i>	<i>317</i>	<i>355</i>	<i>1 608</i>	<i>257</i>
<b>Average per 1 ha UAA</b>							
Greece	632	86	147	107	35	209	16
France	517	68	101	93	14	114	34
Hungary	462	54	55	58	17	87	25
Italy	1 024	140	100	96	117	372	38
Netherlands	3 073	678	137	171	408	437	317
Poland	514	52	85	39	21	64	17
Sweden	592	42	75	29	28	264	53
Slovenia	387	33	41	23	33	132	51
<b>EU-25</b>	<b>628</b>	<b>77</b>	<b>84</b>	<b>67</b>	<b>38</b>	<b>161</b>	<b>52</b>
<i>Macedonian sample</i>	<i>780</i>	<i>70</i>	<i>94</i>	<i>77</i>	<i>86</i>	<i>390</i>	<i>62</i>

Source: Survey and own calculations based on the FADN public database

**Tab. 5:** Farm income comparison in 2004 (EUR)

	Total output (SE 131)	Gross farm income (SE410)	Farm net value added (SE415)	Family farm income (SE420)
<b>Average per agricultural holding</b>				
Greece	16 982	14 478	12 171	10 380
France	122 742	71 697	49 221	27 579
Hungary	55 792	24 966	18 111	6 607
Italy	55 281	37 174	30 676	24 555
Netherlands	278 710	123 037	88 687	29 793
Poland	19 027	9 656	6 850	5 872
Sweden	119 831	55 647	28 491	6 529
Slovenia	15 537	10 900	6 472	4 895
<b>EU-25</b>	<b>61 935</b>	<b>36 615</b>	<b>28 086</b>	<b>18 097</b>
<i>Macedonian sample</i>	<i>10 371</i>	<i>5 474</i>	<i>4 575</i>	<i>4 113</i>
<b>Average per 1 ha UAA</b>				
Greece	2 679	2 284	1 920	1 637
France	1 666	973	668	374
Hungary	1 129	505	366	134
Italy	3 300	2 219	1 831	1 466
Netherlands	8 944	3 949	2 846	956
Poland	1 210	614	436	374
Sweden	1 284	596	305	70
Slovenia	1 228	862	512	387
<b>EU-25</b>	<b>1 804</b>	<b>1 067</b>	<b>818</b>	<b>527</b>
<i>Macedonian sample</i>	<i>2 517</i>	<i>1 328</i>	<i>1 110</i>	<i>998</i>

Source: Survey (applicative model) and own calculations based on FADN public database

labour is hired. The Macedonian farmers rarely engage external labour on permanent basis (except in sheep production, where a shepherd is regularly hired). Some of the potential expenses are actually omitted; for instance, hired or contracted labour, and even permanent labour, is paid directly or in kind, meaning that payment of social benefits and health insurance is avoided. Also, investments in agriculture are very low and therefore the farmers are rarely users of borrowed capital (only 2% of the surveyed farmers used commercial bank loans). The main reason behind this is the lack of available sources of financing in agriculture, high collateral demands and unfavourable interest rates.

When farm family income indicators are compared on farm level, the Macedonian holdings achieve the lowest average value of 4 113 EUR, the EU-25 average being 18 097 EUR/holding. Linking the farm income to the utilised agricultural area, Macedonia is among the countries with highest farm income per 1 ha. It has to be stated that the results from the Macedonian sample are higher than the actual situation, since the farms included in the sample were in average larger and business-oriented.

All this leads us to an argument that perhaps the most realistic indicator for comparison, at this stage of Macedonian agriculture, is the gross farm income, given that the total output value and the intermediate consumption are fairly accurate (also noted by Keszthelyi, 2005).

## DISCUSSION AND CONCLUSIONS

Having a functional farm accountancy data system in Macedonia, in compliance with the EU-FADN, will be useful both on micro level (farm management purposes) and macro level (agricultural policy makers, extension and science).

The research revealed that the Macedonian farms, in physical and economic terms, are far smaller than the EU average. With high level of production factors, especially labour, the farms reach a low level of economic output. Most of the farms (82%), according to the FADN methodology and economic size classification, fall into the group of very small and small farms.

The average engagement of annual working units in Macedonia was 2.0 AWU at 4.2 ha UAA/farm, while the European parallel was 1.7 AWU at average 34.3 ha UAA/farm. This indicates that the Macedonian farms have major issues to confront, mainly with regard to the possibilities to improve the farm efficiency and labour productivity.

Still, the general conclusion is that the structure is comparable to at least a portion of the EU countries. The size of Macedonian farms in economic terms (5.9 ESU) was five times smaller than the EU-25 average (32.7 ESU), but still relatively close to farm's size in Slovenia, Greece or Poland (ranging from 7.3 to 9.4 ESU). It is mostly probable that the structure and size does not demonstrate high competitiveness of the

sample farms, but still taking into consideration that no subsidies were available in the research period, certain development potentials are displayed.

The inclusion of the non-agricultural income in the survey proved to be a useful indicator of the farmers' activity. The Macedonian farms off-farm income demonstrated consistent decline as the economic size of the farm increased. The smaller the farm in the sample, the higher the off-farm income i.e. very small farms realised an additional income of approximately 1 900 EUR; small farms – 1 140 EUR; medium-low farms – 470 EUR and medium high farms generated no extra income.

When farm family income indicators are compared at farm level, the Macedonian holdings achieve the lowest average value when weighted against the EU countries comparison panel. One of the major conclusions with regard to the farm income comparison is the observation that the gross farm income is possibly the most appropriate level to consider. In this context, the gross farm income of the Macedonian sample was around 5 500 EUR/farm, representing about 15% of what an average EU farm generated at that level. The differences between the various income levels indicate methodological weaknesses. The family farm income participates with 50% in the gross farm income in the EU, with high variability from 12 to 73 percentages; the same ratio calculated the Macedonian sample is 75%. When comparing the Macedonian results to those from the EU farms, the total output and intermediate consumption (specific and overhead costs) can be regarded as consistent, and accordingly the gross farm income indicator as considerably accurate.

The Macedonian farmers will face major challenges in the EU pre-accession period. The expected effect of EU-integration process is that the structure of the holdings will gradually change towards larger, primarily commercial and competitive farms; subsequently the income of farms will assumingly improve and move closer to EU levels, at least to those of the countries that joined in the last two enlargement cycles. The subsistence farmers will not gain a lot from the accession, especially if the regional and rural development policy does not increase employment opportunities (Erjavec and Dimitrievski, 2008).

The country's strategic policy aims at strengthening the competitive ability of Macedonian agriculture by increasing the sector efficiency. The investments in agricultural holdings targeting farm modernisation, reconstruction and renewal of the assets, supported by the national agricultural policy and the imminent pre-accession funds, will increase the competitiveness of Macedonian farms and ultimately improve the farm income.

The FADN methodology prospectively could be complemented with more analytical approach when gathering farm enterprises cost data by including input specific quantitative data. The presence of this information (quantity of inputs and applied technology)

could be used to build 'technical matrixes' in the standard-type models for the ex-ante analysis of the effects of certain agricultural policies and to tackle with a greater degree of accuracy the problems linked to the technical efficiency and the analysis of the production processes (Paris and Arfini, 1999).

The technical and economic parameters resulting from an accountancy information system are a valuable source for further scientific and applicative research. Once a functional farm accountancy system has been established, one of the directions in which the analysis may focus is by applying the Positive Mathematical Programming (PMP). PMP methodology is suitable for policy analysis using the FADN data. This methodology features exploitation of positive information which reflects the farmer behaviour and estimate the level of gross margin for the whole farm. In just one PMP model it is possible to include all the farms having homogeneous character improving its ability as tool for policy analysis (Paris and Arfini, 1999).

The farm income analysis of Macedonian farms proved to provide comparable data using the harmonised EU-FADN methodology. The methodology was tested so it can further be applied on a representative sample. The interpretation and analysis of farm level data supply sufficient information on the farm income for decision makers, thus enabling them to make informed decisions.

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Corresponding author:

**Assoc. Prof. A. Martinovska-Stojčeska, Ph.D.**

University Ss. Cyril and Methodius – Skopje

Faculty of Agricultural Sciences and Food

P.O. Box 297, 1000 Skopje

Macedonia

e-mail: [amartinovska@zf.ukim.edu.mk](mailto:amartinovska@zf.ukim.edu.mk)