



Building Capacity for Macedonian Higher Education,
Research and Policy Analysis in Agriculture
- With a focus on Agricultural Economics

**RESEARCH PROJECT ACTIVITY:
COST OF PRODUCTION FOR MACEDONIAN AGRICULTURE
USING FADN-TYPE DATA**

**Economic and technical analysis of Macedonian farms
based on farm accountancy data**

- 2005-2009 period -



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PREFACE

The Republic of Macedonia was given the status of candidate for EU membership in 2005. As a candidate country, Macedonia is obliged to put into place a functional, compatible and harmonized farm accountancy data system, in line with the EU Farm Accountancy Data Network. The Farm Accountancy Data Network (FADN) is an instrument for evaluating the income of agricultural holdings and the impact of the Common Agricultural Policy (CAP) in the European Union (EU). All member states are obliged to provide data to the network thus complementing the picture of the European agriculture for decision-makers.

The objective of this report is to provide an overview, analysis and discussion of the situation and performance of Macedonian farms, based on the Farm Monitoring System (FMS) sample. The FMS, an annual survey conducted in line with FADN methodology, is used as the primary source of data. Farm returns are preliminary in the sense that they are calculated up to the gross farm margin level, and analyzed for six regions within the country. Furthermore, the analysis takes into account the economic size of the farms and the type of farming.

This study was carried out within the framework of the bilateral project titled as “Building capacity for Macedonian policy formulation and economic analysis related to the agricultural sector with a focus on trade, marketing, production, and processing”, funded by the Swedish International Development Agency. The project is jointly carried out by the Institute of Agricultural Economics at the University Ss Cyril and Methodius (UKIM) in Skopje and the Department of Economics at the Swedish University of Agricultural Sciences (SLU) in Uppsala.

The project’s immediate objectives are: (1) to improve the Institute of Agricultural Economics (UKIM) capacity to undertake policy formulation and economic analysis on issues of strategic importance to the agricultural sector, particularly trade, marketing, production, and processing; as well as (2) to improve governmental staff’s and other actors’ in the industry capacity to undertake policy formulation and economic analysis on issues of strategic importance to the agricultural sector, particularly trade, marketing, production, and processing.

This study is in line with these objectives and hopefully it will contribute to the understanding of the economic and technical situation of Macedonian farms.

The authors would like to express their gratitude to the fruitful cooperation and collaboration with the National Extension Agency in Bitola, especially to the National FMS Coordinator Vesna Ilievska, and to the FMS coordinators Pance Ivanov, Valentina Jankoska, Jasmina Koceva, Savka Markudova, Slobodan Serafimovski and Petar Trajkovski. Furthermore, special appreciation goes to the input provided by Lazo Dimitrov.

CONTENTS

EXECUTIVE SUMMARY	5
1. INTRODUCTION.....	6
1.1. Objectives and background	6
1.2. Methodology	6
1.3. Data sample	11
1.4. Scope and limitations.....	13
1.5. Report's results and outline	14
2. FARM STRUCTURE AND TECHNICAL RESULTS	15
2.1. Farm structure	15
2.2. Crop yields	19
3. FINANCIAL RESULTS	22
3.1. Gross margins: Results by product	22
3.2. Gross margins: Results by farm.....	24
4. CONCLUDING REMARKS	34
5. REFERENCES.....	36
Index of tables	37
Index of figures.....	38
Index of appendices	39

List of abbreviations

CAP	Common Agricultural Policy (of the European Union)
CEEC	Central and East European Countries
ESU	European Size Unit
EU	European Union
EUR	Euros
EUROSTAT	Statistical Office of the European Union
FADN	Farm Accountancy Data Network
FMS	Farm Monitoring System
FS	Farm Size
GM	Gross Margin
LU	Livestock Unit
MAFWE	Ministry of Agriculture, Forestry and Water Economy
NEA	National Extension Agency
SGM	Standard Gross Margin
SO	Standard Output
SSO	State Statistical Office
TF	Type of Farming
UAA	Utilized Agricultural Area

EXECUTIVE SUMMARY

The objective of this report is to provide an analysis of the economic and technical performances of the private farms in Macedonia by using data from the Farm Monitoring System (FMS) - the national service that provides FADN type data. Panel data for agricultural holdings are an important source of information about the farm structure and income. Such data provide a basis for an analysis of the technical and economic farm performance over a certain period of time. FADN data are used for different types of analysis as well as monitoring the implementation and evaluating the impact of policy measures.

The Farm Monitoring System (FMS), an annual survey conducted by the National Extension Agency (NEA) in line with FADN methodology, is used as the primary source of data. NEA carries out the data collection and data entry of around 300 family farms since 2001. The farm returns presented in this report are preliminary in the sense that they are calculated up to the gross farm margin level, and analyzed for six regions within the country. The FADN methodology was applied for developing the farm typology, studying economic (farm) size calculating the gross farm income in order to ensure comparability of results.

This report is structured in five chapters. Chapter 1 describes the objectives, background, methodology, data sample, scope and limitations. Following the introductory chapter, Chapter 2 provides the farm structure and technical results. Chapter 3 concerns the financial results, which are presented by product and then analyzed by farm, with regional typology and size comparisons. The conclusions are given in Chapter 4, and the references in Chapter 5. A set of Appendices is enclosed in the end.

The results revealed that FMS sample data can provide a basis for economic and technical farm analysis. The analysis shows that mixed farms are an important segment of Macedonian agriculture, given that these farms are small and usually choose a diverse production structure with a wide range of products. The average number of hectares per FMS farm is around 3-3.5 hectares (ha), higher than the statistical average of 1.37 ha according to the 2007 Census data (SSO, 2007). Most of the farms included in the FMS survey 2005-2009 (68%) belong to the very small farms category of economic size. This structure remained stable throughout the years and no significant changes occurred. The gross margins of the most important crops in the country generally decrease over the years. Similar trend is observed for average farm gross margins, decreasing from 282 thousand denars in 2001, to 260 thousand denars in 2009. The highest gross farm margins are noted for industrial crops farms (usually growing tobacco), followed by sheep farms and mixed farms. Vegetable and fruit farms also produce a gross farm margin that is noteworthy. The lowest gross farm margins occur for cereals and fodder crops farms. The concentration of farm land, output, specific costs, gross margin and farm ESU (calculated for non-negative values) analysed through the Lorenz curve and the Gini coefficient shows unequal distribution.

When compared to the agricultural holdings in the European Union, Macedonian farms are significantly smaller, both in terms of land and livestock capacities and economic size. Yield levels are also lower than the EU average. The gross farm margin at Macedonian holdings is significantly lower as compared to some of the countries that joined the EU in 2004 and closer to the countries that joined in 2007.

1. INTRODUCTION

1.1. Objectives and background

The objective of this report is to provide an analysis of the economic and technical performances of the private farms in Macedonia¹ by using data from the Farm Monitoring System (FMS) - the national service that provides FADN type data. Panel data for agricultural holdings are an important source of information about the farm structure and income. Such data provide a basis for an analysis of the technical and economic farm performances over a certain period of time.

The major source of information regarding the agricultural sector in Macedonia is the State Statistical Office (SSO), which publishes annual yearbooks containing mostly physical data (land use, livestock numbers, yields and prices). The Economic Accounts in Agriculture, compiled since year 1998 in accordance with the EUROSTAT methodology, give insights of the value produced by the agricultural sector. Still, in order to get relevant information on the income and farm returns of agricultural holdings, microeconomic data are required from networks such as the EU FADN. In the European Union, FADN data are used for different types of analysis as well as monitoring the implementation and evaluating the impact of policy measures.

The Farm Monitoring System (FMS), an annual survey conducted in line with FADN methodology, is used as the primary source of data for this report. This provided an overview of the economic situation of Macedonian farms, based on the sample of about 300 farms in six regions (Bitola, Tetovo, Stip, Skopje, Kumanovo and Strumica).

The first FMS survey was conducted in 2001, followed by a Farm Business Data report (Kamphuis and Dimitrov, 2002). The findings from that report are used as a basis for comparison with the preliminary processed FMS data from 2005 to 2009. Similar format was adopted for this report in order to ensure comparability.

Furthermore, more emphasis has been put on the regional context, as part of the analysis was conducted by agro-economic regions.

1.2. Methodology

The FADN methodology was applied for developing the farm typology, studying economic (farm) size calculating the gross farm income in order to ensure comparability of results.

¹ Macedonia's constitutional name is the Republic of Macedonia and this country is being provisionally referred within the United Nations system as 'the former Yugoslav Republic of Macedonia - FYROM' (UNSC Resolution 817/1993)

Farm Accountancy Data Network of the EU

The Farm Accountancy Data Network (FADN) has been established in 1965 as a tool for collecting accountancy data from agricultural holdings in the European Union, with regulation 79/65. The desire to monitor the performance of the Common Agricultural Policy (CAP) led to a need for an instrument providing information about the situation of the agricultural sector in the member states. The economic accounts for agriculture provided by EUROSTAT did not provide an outlook of the performance and income of the different types of farms existing in the EU.

FADN is the only harmonized and standardized source of data obtained from a sample of individual farms across all EU member states. Given the common methodology, the network provides comparable data at a European level. The field of observation of FADN is that of “commercial” farms. A minimum European Size Unit (ESU) is established in each member state to define the commercial farm threshold. The sample is stratified by region, farm size and type of farming. Altogether, more than 100,000 farms are included every year in the sample across the EU 27 member states.

FADN data, once collected, are transmitted to the national liaison offices, and are then forwarded to the European Commission in Brussels, where stored in a joint database.

A minimum number of farms are required for each stratum to assure anonymity, provided that FADN data are confidential and cannot be disclosed or used for tax purposes. Therefore, FADN never publishes nor otherwise provides information about individual farms.

Gross Margin and Gross Output in FADN

Classification of farms in the European Union within FADN is principally done according to two major criteria: economic size of the agricultural holding and type of farming.

Until year 2009, the economic size of the farm was determined as the value of its total farm standard gross margin, expressed as a Community unit of measurement, the European Size Unit (ESU), 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 on average for a period of three to five years. The SGM is an economic criterion expressed in monetary terms, either per hectare of utilized agricultural area in the case of crop enterprises or per head of livestock in the case of livestock farming.

The Standard Output (SO) measure was introduced in FADN in 2009 as the basis for determination of the farm economic size, replacing the previously used Standard Gross Margin (SGM) and European Size Unit (ESU). Standard output refers to the standard value of gross production.

For the purpose of this study, the economic size and type of farming will be determined according to the FADN method, as data are analyzed for the period until year 2009.

Gross margins are also analyzed per ha and per Livestock Unit (LU)²; by region, farm type and farm size, respectively.

² The Livestock Unit coefficients (LU) are used for conversion of the average number of animals per category. For instance, one dairy cow is converted to 1 LU, one sheep to 0.1 LU etc. (RI/CC 882, 2008). The Livestock Unit coefficients, as adopted by FADN, are given in Appendix A.

Farm size and type of farming

The economic size of the farms is calculated in accordance to the FADN methodology (reg. RI/CC 1256, 2008). Taking into consideration the relatively small size of Macedonian farms, whereas the average size of the individual farm ranged from 1.7-2.8 ha (SSO Census, 1994) to as low as 1.37 ha (SSO, Ag. Census, 2007), the farms in this study are grouped on four i.e. six farm size groups, as shown in the next table.

Table 1. Classification of farms by size

Farm size (FS)	ESU* class	Farm size acronym (six groups)	Farm size acronym (four groups)
Very small farm	< 2 ESU	VSF1	VSF
	2-<4 ESU	VSF2	
Small farm	4-<8 ESU	SF	SF
Medium-low farm	8-<12 ESU	MLF1	MLF
	12-<16 ESU	MLF2	
Medium-high farm	> 16 ESU	MHF	MHF

*ESU=European Size Unite, equivalent to gross margin of €1,200 (FADN)

Although classification of the farm size according to the economic criterion is the typical presentation of FADN-type results, farm size is also measured in terms of farm area of cultivated land. This grouping was applied in some sections of the report in order to enable comparability with the 2001 FMS results. For this purpose farms are divided into the following groups, depending on the total cultivable land per farm: less than 2 ha; 2-5 ha; 5-10 ha; 10-15 ha; and farms with more than 15 ha.

The type of farming (TF) is the other classification criterion, defined as the production system of a holding which is characterized by the relative contribution of different enterprises to the holding's total gross margin (GM). The general type of farming level is applied and adjusted in this study, as presented below.

Table 2. Classification of farms by type

Type of farming	Method
Mixed farm	Total livestock gross margin and total crop gross margin are less than 2/3 of the total farm gross margin
Fodder crops	Total fodder gross margin is greater than 2/3 of the total farm gross margin
Fruit	Total fruit gross margin is greater than 2/3 of the total farm gross margin
Vegetables	Total vegetable gross margin is greater than 2/3 of the total farm gross margin
Industrial	Total industrial crop gross margin is greater than 2/3 of the total farm gross margin
Mixed crop	Total crop gross margin is greater than 2/3 of the total farm gross margin
Mixed livestock	Total livestock gross margin is greater than 2/3 of the total farm gross margin
Cereals	Total fodder gross margin is greater than 2/3 of the total farm gross margin
Grapes	Total grape gross margin is greater than 2/3 of the total farm gross margin
Goats	Total goat gross margin is greater than 2/3 of the total farm gross margin
Bees	Total bee gross margin is greater than 2/3 of the total farm gross margin
Sheep	Total sheep gross margin is greater than 2/3 of the total farm gross margin
Pigs	Total pig gross margin is greater than 2/3 of the total farm gross margin
Cattle	Total cattle gross margin is greater than 2/3 of the total farm gross margin

Concentration measures

The statistical distribution of a variable, in this case the scatter of farm income, farm specific costs, farm land capacity, farm gross margin and farm size expressed in terms of ESU can be illustrated by the **Lorenz curve**: It is a graphical representation of the cumulative distribution function of the empirical probability distribution (Gastwirth, 1972). The information in a Lorenz curve may be summarized by the **Gini coefficient** which is defined as the area between the line of perfect equality and the observed Lorenz curve – i.e. the percentage of the area between the line of perfect equality and the line of perfect inequality (ibid). The Gini coefficient can range from 0 to 1. A low Gini coefficient indicates a more equal distribution, with 0 corresponding to complete equality, while higher Gini coefficients indicate more unequal distribution, with 1 corresponding to complete inequality. To be valid, Lorenz curve and Gini coefficients are obtained for non negative values of the variable under study. Therefore, only non-negative values were taken into account in the case of farm gross margin calculation. The data were processed using statistical software based on the *R framework*³ (Wessa, 2010).

Farm income indicators in FADN

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). Data currently available from the FMS are reliable up to this indicator.

Regional perspective

Regional analysis provides a different perspective of the farms' economic and technical performances. The National Extension Agency (NEA) has determined six regions within the country according to agricultural and climatic conditions. Hence, the FMS survey is conducted in the following regions:

Region	Acronym	Geographical position
Bitola	BIT	South-Western region of the country; area of the lakes of Ohrid and Prespa and also of the Pelagonia plain
Kumanovo	KUM	Northern corner of the country; hilly landscape
Skopje	SKP	Central region of the country stretching from North to South, along the Vardar river basin (Povardarie)
Štip	STIP	Eastern part of the country characterized with semi-arid climate and Ovce Pole plain
Strumica	STR	South-Eastern region of the country, rather flat and fertile soils
Tetovo	TET	North-Western region of the country; highly mountainous, but also comprising the fertile Polog plain

³ This software calculates concentration indicators other than the Gini coefficient, which are reported in appendix B for information purposes. However, they are not commented or discussed in the result sections of this report.

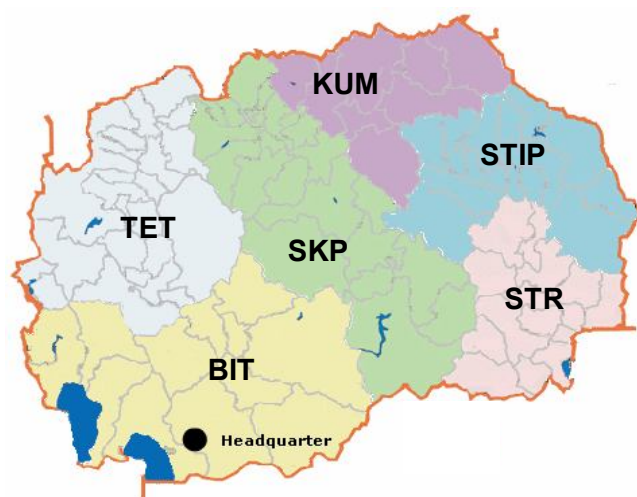


Figure 1. Regions as determined by NEA
(www, NEA, 2011)



Figure 2. Regions as determined by SSO
(www, SSO, 2011)

This FMS regional classification shown in Figure 1 differs to some extent from the one of the State Statistical Office (SSO), shown in Figure 2. SSO organizes its surveys in eight statistical regions, as shown in figure 2. Basically, Skopje region within FMS is equivalent to two statistical regions: Skopje and Vardar basin region, except for the municipality of Sveti Nikole. Furthermore, the southwestern statistical region is divided between Tetovo and Bitola FMS regions. The eastern statistical region is identical with Stip FMS region, and the southeast statistical region is identical with Strumica FMS region.

Data processing and data quality

The data derived from the survey were processed using a model for farm business data analysis, specifically developed for this purpose in *MS Excel* application. The data were originally gathered in two databases: (i) database for incomes and (ii) database for costs, with an associated codebook containing the codes of farms, regions, advisors, type of crop or livestock and costs items. Moreover, another database containing the farm gross margins was developed, and supplementary codes of farm size and typology were added. The result tables were derived with a pivot table support. The gross margin of farms has been calculated as the difference of the total value of output and the total specific costs.

In order to ensure a correct picture of the results, in most cases averages have been calculated as weighted means.

The prices used are taken as nominal, with conversion rate of 61.2 Macedonian denars to one euro (www, NBRM, 2010).

Data are collected directly from the farmers, using standard forms in line with the EU-FADN Farm Return questionnaire. The advisors usually visit the farmer several times per year in order to gather all necessary data. The data are then entered into a computer database using specifically-designed software. The FMS system not only provides aggregated data per household, but also includes detailed income and cost data per each farm enterprise, which enables calculation of analytical crop and livestock enterprise budgets (NEA, 2007).

The original selection of farms to be included in the FMS survey was based on a provisional farm typology, following the Standard Gross Margin (SGM) approach as defined by FADN (RI/CC, 882/2008) and therefore not statistically representative, which can thus be regarded as an approximation (Kamphuis and Dimitrov, 2002). The reasons behind this provisional approach are due to the fact that the annual Statistical Office survey is not representative; the SGM were calculated based on available reports and expert calculations; and the selection was restricted to farmers who already had contacts with NEA (*ibid*). The Agricultural Census carried out in 2007 provided grounds for determination of a representative sample for all agricultural holdings within the country, to be used from year 2010.

Number of farms

The number of farms included in the FMS survey is also given in this section, along with regional farm typology and farm size structure (see Table 3). In the first year of the survey (2001), 417 farms were included. The number of farms has steadily decreased in the following years, mainly due to financial difficulties to meet the costs of the survey. However, since 2009 the situation has stabilized and the number of farms increased to the original level.

In a regional context, during the period 2005 to 2009 most farms included in the survey were from the Skopje and Bitola regions, with about a quarter of the total number each. Strumica farms represent 18%, Tetovo farms 14%, Kumanovo 11% and Stip 9% of the total sample.

The regional structure of the FMS survey in terms of number of individual agricultural holdings is generally reflecting the structure recorded at the latest Agricultural Census (2007), as shown in the following table and figure.

Table 3. Number of farms in the FMS survey per region

Region	2005	2006	2007	2008	2009	All years (2005-2009)	Structure	
							FMS	SSO*
BIT	71	67	44	48	110	340	23%	20%
KUM	61	30	26	23	25	165	11%	11%
SKP	73	66	63	69	94	365	25%	22%
STIP	27	15	16	13	59	130	9%	14%
STR	47	36	57	61	69	270	18%	14%
TET	<u>43</u>	<u>32</u>	<u>34</u>	<u>30</u>	<u>62</u>	<u>201</u>	<u>14%</u>	<u>18%</u>
All regions	322	246	240	244	419	1471	100%	100%

*Source: Calculation derived from Agricultural Census 2007, Book III

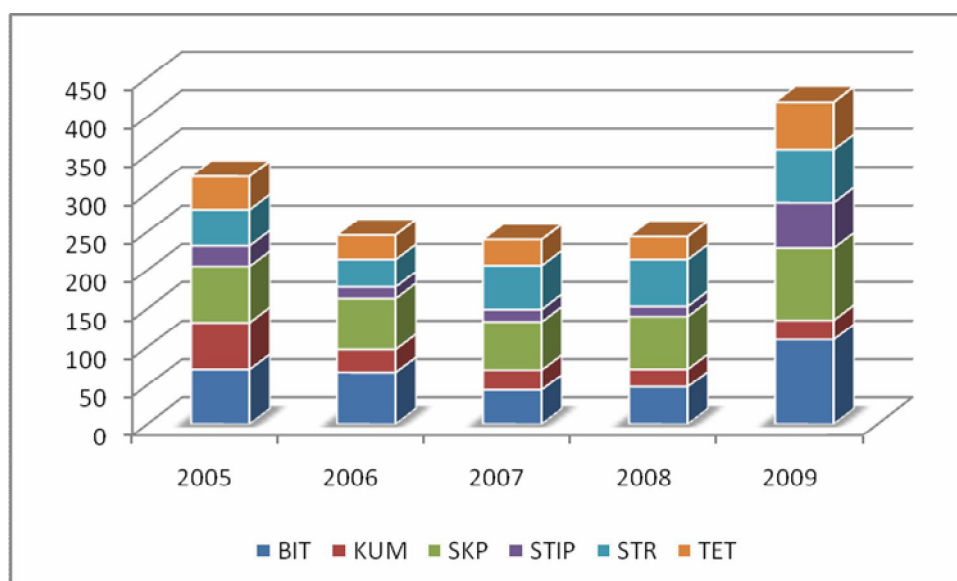


Figure 4. Total number of farms included, per region

1.4. Scope and limitations

The results from this report should be interpreted with caution, having in mind few limitations.

First, this analysis only concerns privately-owned individual farms (defined as family agricultural holdings by the Law on Agriculture and Rural Development, 2007) and excludes data from agricultural companies and cooperatives. Family farms own or lease around 80% of agricultural land, whereas agricultural companies lease the remaining 20% that are in the ownership of the state (SSO, 2008). However, 46% of the value of purchased agricultural products in 2008 belongs to agricultural companies (SSO, 2009). Notably, in most of CEEC⁴ 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. In this respect, NEA will include data from agricultural companies and cooperatives from 2010 onwards.

Second, the quality of data collected during the FMS survey was subjected to a detailed check. The original data were scrutinized and filtered following the principles of homogeneity, continuity and coherence. The deviations from the observations' mean were taken into account. Last but not least, an expert cross-checking was conducted, checking the plausibility of data, especially in terms of yields and prices. Costs were checked for each cost item and as aggregated on an enterprise level. Data were corrected or interpolated where required.

Third, complete FMS data were available from 2005 onwards. The results are based on the averages drawn only upon the farms included in the FMS sample, and at this stage were not extrapolated for the whole population of farms in the country.

Fourth, the farm fixed costs were not complete for all farms within the FMS data set and were therefore excluded; hence, the farm returns can be calculated up to the gross farm

⁴ CEEC stands for Central and East European Countries.

margin level. However, it is important to stress that these farms use dominantly family labor⁵ and use almost no external sources of financing. Moreover, a significant portion of farms generates off-farm income to supplement the household. A previous study showed 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 commercially oriented (Martinovska Stojceska *et al*, 2008).

1.5. Report's results and outline

The objective of this report is to provide an analysis of the economic and technical performances of the private farms in Macedonia by using data from the Farm Monitoring System (FMS) sample - the national service that provides FADN-type data. Panel data for agricultural holdings are an important source of information about the farm structure and income. Such data provide a basis for an analysis of the technical and economic farm analysis over a certain period of time.

The report is structured in five chapters. Following the introductory chapter, Chapter 2 provides the farm structure and technical results. Chapter 3 concerns the financial results, which are presented by product and then analyzed by farm, with regional typology and size comparisons. The conclusions are given in Chapter 4, and the references in Chapter 5. A comprehensive set of appendices is enclosed in the end. Appendix A provides a list of the Livestock Unit coefficients, as defined by EUROSTAT and used in FADN. Appendix B consists of concentration measures indicators. Appendix C contains extracts from the FMS database with data with regard to the key economic and technical indicators in the period from 2005 to 2009.

⁵ The only exception is sheep farms.

2. FARM STRUCTURE AND TECHNICAL RESULTS

2.1. Farm structure

Farm structure by type of farming

The farm structure of the FMS sample with regard to type of farming is given in Table 4 and illustrated in Figure 5. In general the 2001 sample corresponds closely to the 2009 sample in terms of the breakdown by type of farming, given that the number of the farms included in the sample is almost equal. The structure by type of farming in 2005 is more evenly distributed among the various farm types.

In the 2001 sample, more than half of the farms are classified as mixed; in 2005 the share of mixed farms falls to 30%, and then it increases to 53% in 2009. Mixed farms are, without any doubt, an important segment of Macedonian agriculture, given that these farms are small and usually choose a diverse production structure with a wide range of products.

Vegetable farms are represented with a relatively stable share, ranging from 11% in 2009 to 15% in 2005; grape-growing farms represent a significant share with around 7-8% in years 2001 and 2009 and with 14% in 2005, respectively. Cattle farms have a steady share from 6-8% throughout the years.

Table 4. Structure of farms by type of farming (number of farms in the FMS sample)

Type of farming	2001		2005		2009	
Vegetables	56	13%	47	15%	44	11%
Mixed crop	134	32%	53	16%	120	29%
Grapes	35	8%	45	14%	31	7%
Sheep	13	3%	46	14%	30	7%
Mixed farm	112	27%	45	14%	99	24%
Cattle	29	7%	26	8%	27	6%
Fruit	17	4%	20	6%	30	7%
Cereals	21	5%	23	7%	14	3%
Other	28	7%	17	5%	24	6%
All farms	417	100%	322	100%	419	100%

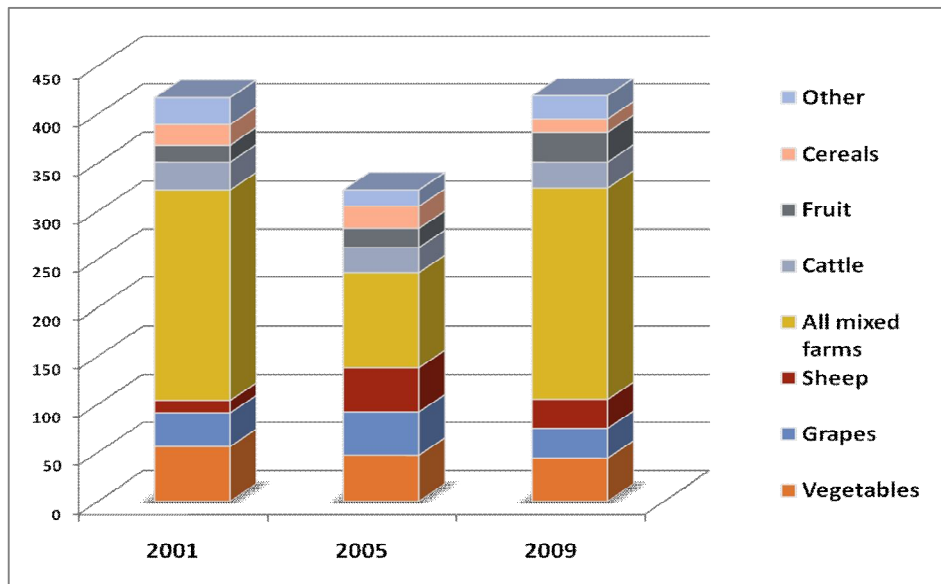


Figure 5. Number of farms per type of farming, selected years

Figure 6 provides an illustration of the total number of farms included in the survey⁶ and sorted by type of farming. Mixed crop farms are most frequent, with over 350 observations in the total sample of over 1,900 farms, followed by mixed farms and vegetable farms, with over 270 observations each. Grape, sheep, cattle, fruit and cereal farms are also significantly represented in the sample.

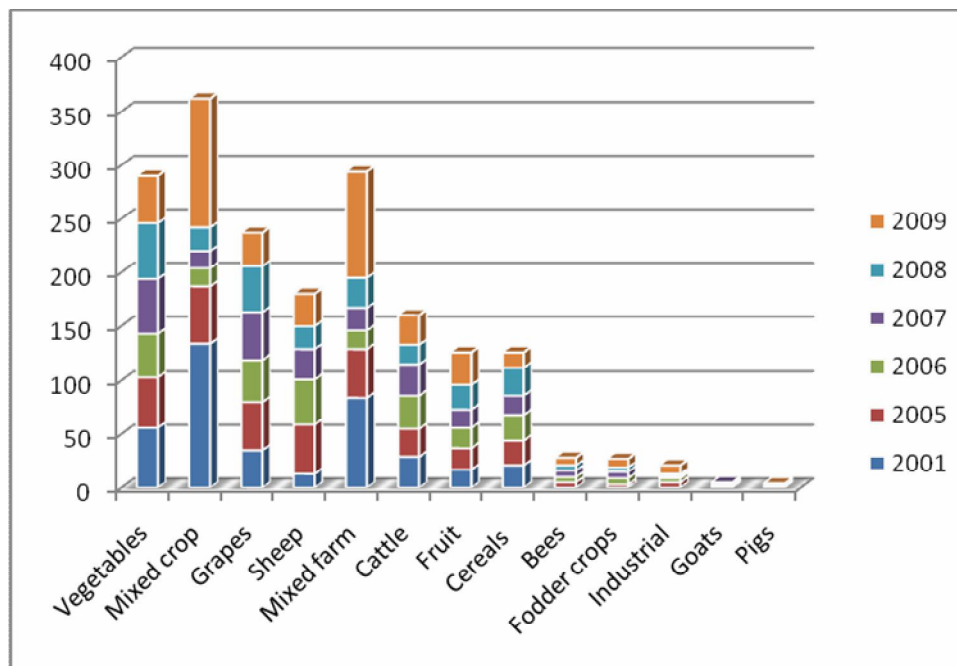


Figure 6. Total number of farms included in the survey, per type of farming

⁶ The total number of farms refers to the whole sample for 2001 and the period 2005-2009.

Analysed per region for the period 2005-2009, one-third of the farms in Bitola (BIT) are regarded as mixed farms (including mixed crop and livestock farms); the other types of farming prevalent in this region are fruit farms (mostly apple farms in the Resen area) and sheep farm (typical for this region) with each having a share of about 20%. In Kumanovo half of the farms are mixed, followed by cattle, cereals and sheep farms. One-third of the Skopje farms are producing grapes as their main crop, since the Vardar basin river being the most important grape growing area belongs to this region. Mixed farms take the second place, followed by vegetable farms, cattle farms and sheep farms. Stip region is featured with mixed and grape growing farms. Strumica region is typical for vegetables. Tetovo region has a rather even structure of mixed farms, combined with cereals in the Polog plain and sheep farms in the highlands (Figure 7).

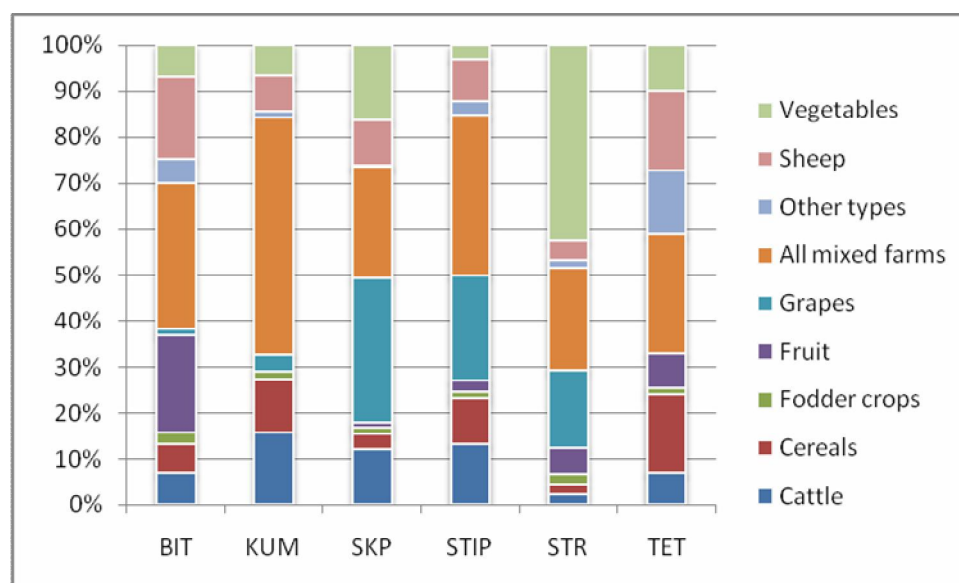


Figure 7. Structure of farms, per region and type of farming

Farm structure by size

Most of the farms included in the (2005-2009) FMS surveys belong to the very small farms category of economic size, reflecting the structure of family farms in Macedonia (see Table 5 and Figure 8). The largest share of farms are those with farm gross margin of less than 2 ESU (VSF1), followed by farms with farm gross margin from 2 to 4 ESU (VS2). Small farms with farm gross margin between 4 to 8 ESU comprise 20% of the surveyed farms. Medium-sized farms account for 12% of the total sample.

Table 5. Structure of farms by economic size (number of farms)

Farm size	All years	Share
VSF1	687	47%
VSF2	314	21%
SF	290	20%
MLF1	100	7%
MLF2	30	2%
MHF	50	3%

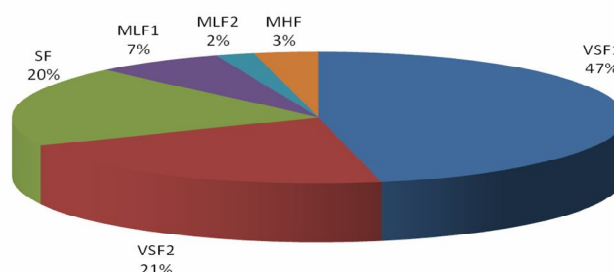


Figure 8. Number of farms per economic farm size

The development of the farm size in terms of number of hectares of cultivated land remained stable throughout the years and no significant changes occur. The majority of the farms have a size of less than 2 hectares of land (48-52%), followed by farms that cultivate 2 to 5 ha (32-35%). Based on these statistics, less than 20% of the farms cultivate more than 5 ha of land (Table 6).

Table 6. Structure of farms by farm size (ha of cultivable land)

Farm size	2001		2005		2009	
<2 ha	200	48%	167	52%	203	48%
2-5 ha	146	35%	103	32%	134	32%
5-10 ha	45	11%	33	10%	54	13%
10-15 ha	<u>26</u>	<u>6%</u>	<u>18</u>	<u>6%</u>	<u>28</u>	<u>7%</u>
All farms	417	100%	322	100%	419	100%

Farm structure by type of farming and size

The average number of hectares per (FMS-surveyed) farm is around 3-3.5 hectares (Table 7). 88% of the farms within the sample cultivate land. The highest portion of land cultivated on a farm is on mixed farm, mixed crop and cereal farms. Mixed farm's cultivated land has increased in the past period by 44%, whereas the area under cereals has experienced a decrease by 42%.

The area under the more profitable cash crops included in the survey has experienced a positive trend. Thus, the average farm size of vegetable farms has grown from 2.39 hectares in 2001 to 2.87 hectares in 2005 and finally reached 3.39 hectares in 2009. The area of grape-growing farms has also increased from 1.31 ha/farm in 2001 to 1.77 ha/farm in 2009.

The livestock numbers on an average FMS farm, converted into Livestock Unit coefficients (LU), were 5.82 LU in 2001, then decreased to 4.56 LU in 2005 and increased significantly to 7.65 LU in 2009 (Table 8). During this period the cattle numbers follow the same trend within the sample; many farms purchased milking cows in the period from 2005-2008 as a result of the then growing number of dairies. Sheep numbers vary significantly: this situation is probably due to the selection of farms in the sample; hence, an average farm would have a herd of 324 sheep in 2009.

Table 7. Size of farms by farm type (ha of cultivated land)

Type of farming	2001 (1)	2005 (2)	2009 (3)	(2)/(1)	(3)/(1)
Vegetables	2.39	2.87	3.39	1.20	1.42
Mixed crop	4.40	3.73	3.09	0.85	0.70
Grapes	1.31	1.69	1.77	1.29	1.35
Sheep	1.04	1.53	3.47	1.47	3.34
Mixed farm	4.05	5.07	5.83	1.25	1.44
Cattle	2.93	3.47	2.55	1.18	0.87
Fruit	2.10	3.13	2.46	1.49	1.17
Cereals	7.28	3.49	4.25	0.48	0.58
Other	<u>2.60</u>	<u>3.07</u>	<u>2.93</u>	<u>1.18</u>	<u>1.13</u>
All farms	3.52	3.00	3.26	0.85	0.93

Table 8. Size of farms by type of farming (livestock units - LU)

Type of farming	2001 (1)	2005 (2)	2009 (3)	(2)/(1)	(3)/(1)
Vegetables	0.27	0.25	0.27	0.92	1.00
Mixed crop	1.91	2.29	0.93	1.20	0.49
Grapes	0.00	0.00	0.00	/	/
Sheep	46.31	17.60	32.41	0.38	0.70
Mixed farm	7.70	5.73	11.48	0.74	1.49
Cattle	13.67	8.73	15.87	0.64	1.16
Fruit	0.20	0.00	0.04	0.00	0.20
Cereals	0.10	0.90	0.43	9.00	4.30
Other	<u>18.22</u>	<u>4.58</u>	<u>18.56</u>	<u>0.25</u>	<u>1.02</u>
All farms	5.82	4.56	7.65	0.78	1.31

2.2. Crop yields

The FMS data set provides crop yields per hectare that are analyzed in a regional context for the period 2005-2009 (tables 9 and 10).

The weighted average of alfalfa yields in the period 2005-2009 was 6.7 t/ha. Highest yields were achieved in 2005 (9.6 t/ha) and lowest in year 2007 (4.4 t/ha). The highest average yield in all years was reached in Tetovo region with 8.8 t/ha. The farms in Strumica region have achieved the highest yield of around 11 t/a in years 2008 and 2009, but also the lowest yield of 2.6 t/ha in 2007.

Wheat is the most important cereal crop in the country. The five-year weighted average (2005-2009) is 3.2 t/ha countrywide. Regionally, Skopje farms achieve the highest yields (especially since there are few specialized cereal farms in this region) with 3.7 t/ha. Lowest yields are expectedly reached in Stip region with 2.7 t/ha, being the most arid region. Highest yield was reached in Tetovo in 2007 with 4 t/ha, although overall 2008 was the most successful year with a country average yield of 3.8 t/ha.

Barley yields were relatively stable in the past five years, with a weighted average of all years and all regions of 3.3 t/ha. Highest average yields are normally reached in Skopje, and lowest in Kumanovo region. The highest yields were achieved in 2008, which was a high yield year for all crops, with an average amounting 4.3 t/ha; the highest yield was in Skopje region with almost 5 t/ha and Tetovo region with 4 t/ha.

Maize is cultivated in all regions; Tetovo farms achieve highest yields (in average 6 t/ha), with the highest yield in year 2007 (7.6 t/ha). Highest variation is noted among Strumica farms with yields ranging from 2.3 t/ha in 2009 to 7.5 t/ha in 2008. The lowest yields of 1.2 t/ha are in Skopje in 2007.

Tobacco is present in four regions; Bitola growers (comprising Prilep) are most common with an average yield of 1.7 t/ha, followed by Strumica growers with lower average yields of around 1 t/ha. Highest yield was achieved in Kumanovo in 2005, with 2 t/ha.

Table 9. Regional yields of selected fodder, cereal and industrial crops, in kg/ha

Crop	Region	2005	2006	2007	2008	2009	Weighted average
Alfalfa	BIT	9420	4860	3727	5961	6673	6319
	KUM	9534	6679	6400	6238	8015	8041
	SKP	10216	3570	5666	6454	6716	6196
	STIP	10638		6629	4976	7868	7518
	STR	9969	4631	2637	11788	11400	4745
	TET	9818		9586	6782	8343	8783
Alfalfa Total		9660	4874	4415	6179	7232	6722
Barley	BIT	3308	3252	2617	3168	2806	3096
	KUM	2521	3123	2047	3212	2792	2650
	SKP	3307	3628	3215	4935	3624	4212
	STIP	2947	3628	2047	3509	2782	2820
	STR	2930	3936	3429		2969	3432
	TET	2738	1727	3500	4000	2807	2530
Barley Total		2901	3367	2379	4340	2951	3260
Maize	BIT	5127	2992	6191	5209	5872	5034
	KUM	5083	3491	4471	5781	4682	4761
	SKP	5158	4914	1214	6483	4925	4199
	STIP	4456		4301	5030	5999	5803
	STR	6148	4316	7214	7542	2337	4047
	TET	4713	3413	7601	6560	7475	6018
Maize Total		5111	3572	4777	5972	5421	4993
Wheat	BIT	3218	2895	2287	3593	2982	3056
	KUM	3334	3170	2391	3147	3117	3121
	SKP	3607	2679	2913	4262	3318	3699
	STIP	3339	1520	1723	3201	2690	2709
	STR	3279	3398	3721	3753	3479	3487
	TET	3237	3608	4039	3667	3349	3547
Wheat Total		3319	3056	2478	3874	3047	3232
Tobacco	BIT	1881	1928	1551	1813	1485	1676
	KUM	2000	1550				1775
	SKP		1900				1900
	STR	1748	1406	631	753	1170	977
Tobacco Total		1860	2087	1121	1391	1441	1564

Note: Highlighted figures in purple and green correspond respectively to minimum and maximum yields among the six regions.

Apples are the most important fruit crop in Macedonia. Bitola region (comprising Resen and the big lakes area) is the typical apple region, where expectedly the highest level of 37 t/ha in 2007 yield is achieved, or in average 28 t/ha for all years. Tetovo is the second region by importance, where yields reach around 23 t/ha. Lowest yields are achieved in Skopje region (9 t/ha) and Strumica region (16 t/ha). Grapes are grown in all regions; Skopje region with the Vardar river basin is the most important region, although the yield is the lowest on average with 9.4 t/ha. Highest yields are achieved in Strumica region, with around 16 t/ha. Watermelon yields vary around 40 t/ha; the highest yields are achieved in Skopje with 54 t/ha in 2008, and the lowest in Bitola with 25 t/ha in 2005.

Vegetables are important crops in all regions, dominantly in Strumica and Skopje. Yields vary significantly between regions and years, and are subject to few factors, such as technology choice (open field, plastic tunnels or glasshouses production), types/varieties used and season. As for cabbage, Strumica region has yields from 32 to 38 t/ha, except for 2006 as a year of extremely low yields. Skopje, Kumanovo and Bitola regions also have yields of around 31-33 t/ha. Peppers yields vary around 24 t/ha. Highest yields are noted in Skopje region with 34 t/ha in average, whereas Strumica region farms have around 26 t/ha. Tomato yields are around 56 t/ha; Strumica region farms produce the highest amounts with 62 t/ha, with the highest average of 82 t/ha in 2007. Skopje farms follow with an average of

53 t/ha and a 2008 year highest of 112 t/ha. The yields in Kumanovo region are the lowest with 26 t/ha.

Table 10. Regional yields of selected fruits and vegetables, in kg/ha

Crop	Region	2005	2006	2007	2008	2009	Weighted average
Apples	BIT	25310	35281	37444	30110	24784	27782
	KUM	18250	17273				17738
	SKP	19920	22000	18000	8625		18638
	STR	16250	17000	27333	25333	17867	20475
	TET	22239	26176	27333	29319	16442	22814
Apples Total		25171	34023	35813	29847	24280	27382
Wine grapes	BIT	11143	15813	20000	9500	14947	13157
	KUM	11704	17642			8000	12472
	SKP	11263	7039	10114	10575	8600	9382
	STIP	11302	16188	8520	11431	11876	13662
	STR	12352	15019	12513	16948	18545	15657
Wine grape Total		11450	8933	10508	12025	11449	10866
Cabbage (all types)	BIT	27154	21692	32576	48175	30431	30664
	KUM	35090	27710		32000		33107
	SKP	21571	24118		26567	50000	31833
	STR	38300	7022	32521	34359	35424	17882
Cabbage Total		31759	8923	32547	35455	36663	21244
Cucumbers	BIT	10000	20000	32273	38000	30435	23760
	SKP	56632	41000		74453	73317	66911
	STR	30928		84800	16000	90700	22633
Cucumbers Total		28793	9340	68750	25140	73819	26016
Peppers (all types)	BIT	16359	12451	24444	20531	20292	18977
	KUM	21315	21872	10000	13000	10000	19408
	SKP	31609	20639	39898	47804	34564	34187
	STR	28244	26643	24209	30212	19811	25895
	TET	10317	10680	15000		9000	10469
Peppers Total		20989	24492	25306	26778	21734	23788
Potatoes	BIT	24821	27368	30661		28274	27735
	KUM	20201	15614	17682		16769	18250
	SKP	22036	20609	24571		23200	22639
	STIP	25591	21500			27188	26002
	STR	23545	16547	8198		19745	13506
	TET	19668	25011	24324		30342	24809
Potatoes Total		23722	19574	15455		25679	20897
Tomatoes (all types)	BIT	42300	29300		33000		35980
	KUM	31046	17372	21000	48000	25000	26484
	SKP	37557	18827	61040	111746	65828	53354
	STR	33182	50763	82302	78088	78117	62307
	TET	11667	7733	30000			16467
Tomatoes Total		33615	32236	74100	78025	70057	55951
Watermelons	BIT	24480	40000				32240
	SKP	28322			53667	48545	47184
	STR	30511	46068	39931	38832	39973	40845
Watermelons Total		24782	47408	39931	39373	43847	41855

Note: Highlighted figures in purple and green correspond respectively to minimum and maximum yields among the six regions.

3. FINANCIAL RESULTS

3.1. Gross margins: Results by product

The gross margins of most important crops in the country, as calculated from the FMS sample, generally decrease over the years. Overall, this situation likely stems from increasing input prices, and decreasing producer prices. It is important to state that these gross margin results do not include the income from subsidies, which became an important component since 2004.

Table 11 provides an overview of the gross margin calculation for some major crops in 2001 (extracted from Kamphuis and Dimitrov, 2002), weighted averages from FMS in 2005 and 2009; as well as a recently calculated aggregation of Standard Output in 2009 (calculated by MAFWE for FADN sample determination).

Table 11. Gross margin calculation for some major crops 2001, 2005 and 2009 (in denars/ha)

Crops	2001* (1)	2005 (2)	2009 (3)	Period 2005-09 (4)	(2)/(1)	(3)/(1)
Barley	25,101	12,921	4,647	19,062	0.51	0.19
Maize	74,260	41,526	27,804	31,896	0.56	0.37
Tomatoes	898,044	267,489	627,015	580,249	0.30	0.70
Peppers	453,559	181,005	306,528	271,026	0.40	0.68
Watermelons	252,303	42,584	152,432	96,645	0.17	0.60
Potatoes	222,773	117,678	185,385	145,247	0.53	0.83
Onion	278,081	152,269	261,550	204,846	0.55	0.94
Cabbage	170,534	223,278	244,483	176,504	1.31	1.43
Beans	132,403	187,327	69,229	164,329	1.41	0.52
Apples	294,061	113,419	134,672	168,763	0.39	0.46
Wine grape	150,491	110,590	66,486	78,180	0.73	0.44
Tobacco	199,376	196,045	214,283	181,960	0.98	1.07
Alfalfa	102,080	58,452	29,374	36,325	0.57	0.29
Wheat	20,031	14,853	6,134	14,732	0.74	0.31

Source: * Kamphuis and Dimitrov (2002)

The gross margins of cereals have declined substantially. The index 2009/2001 is particularly low for these crops, primarily due to the low producer prices in 2009. The gross margin of barley, for instance, is just one-fifth of the 2001 level; the five-year average (2005-09) is around 40% lower than the 2001 gross margin. The gross margins of both maize and wheat have also decreased significantly, thus in 2009 reaching approximately one-third of the 2001 gross margin amount. The standard output of cereals, calculated as total crop output multiplied by producer price, correspond to the FMS gross margin levels.

The gross margins of wheat, barley and maize have decreased in 2009. The highest levels of gross margin were achieved in 2008, ranging from 25,000 denars/ha for wheat to 36,000 denars/ha for maize (Figure 9).

The average gross margin of wheat has varied significantly in the period 2005 to 2009 and by region (Figure 10). The lowest gross margin was noted in Stip in 2009 (750 denars/ha) and the highest in Strumica in 2008 (36,000 denars/ha).

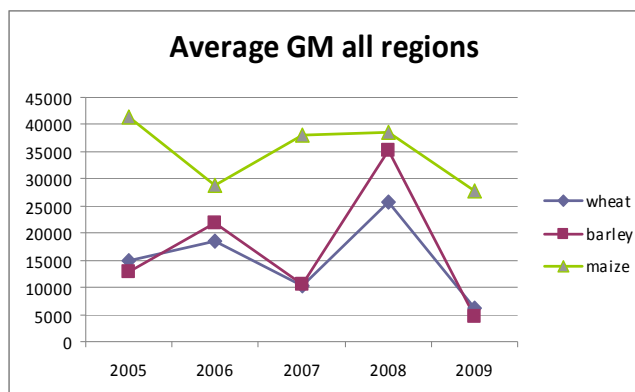


Figure 9. Average GM for some cereals

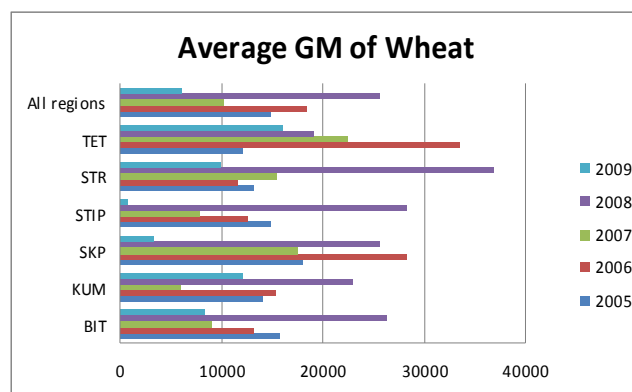


Figure 10. Average GM of wheat, per regions

The gross margins of fruits have decreased in the past period; the area under orchards and vineyards was declining in the past period, and only recently new plantations are being planted (Figure 11). Apples have the highest gross margins in the Strumica and Bitola regions, ranging from 300 to 400 thousand denars/ha in year 2007 and 2008. The gross margins in 2009 have dropped to around 100 thousand/ha (Figure 12).

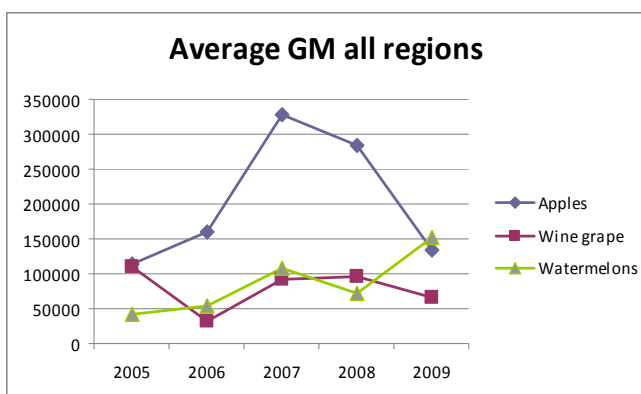


Figure 11. Average GM for some fruits

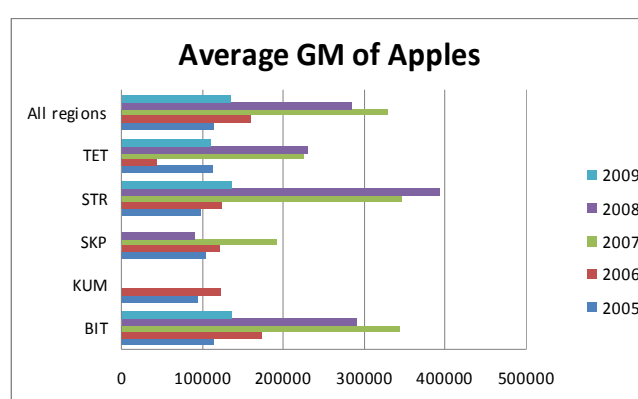


Figure 12. Average GM of apple, per regions

The gross margins of vegetables have dropped by at least half in the past period, except for cabbage where significant increase is marked (Figure 13). The inputs' and producer prices of these commodities also influenced this decline. The gross margin of tomato is the highest in Strumica region, reaching over one million denars/ha in 2008, and dropping by half in 2009 (Figure 14).

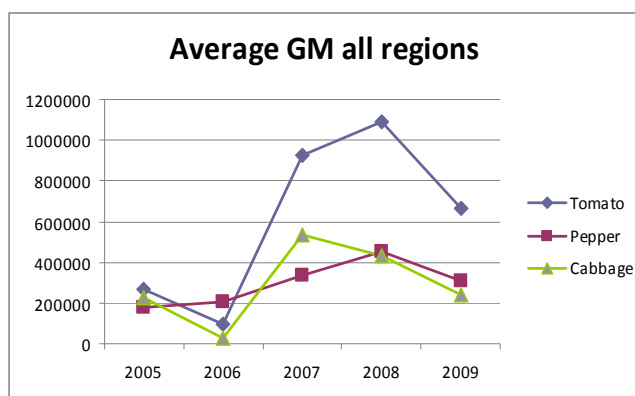


Figure 13. Average GM for some vegetables

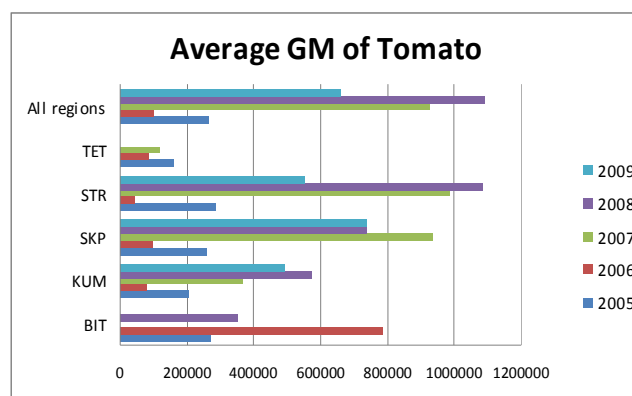


Figure 14. Average GM of tomato, per regions

3.2. Gross margins: Results by farm

Number of FMS farms in terms of GM

The gross margin value of farms has changed significantly during the course of the years. In year 2001, only 16% of the farms had less than 100,000 denars (€1,630) of the total gross margin per farm (Table 12 and Figure 15). This percentage has increased to around 36% in the period 2005-2009, meaning that a significantly larger portion of the farms got lower farm gross margin value and relatively speaking the farm gross margin has decreased for a large number of Macedonian farms in the last decade. It is important to stress here that no minimum threshold was set for inclusion of farms in the FMS survey. In addition, holders of very small farms practice agriculture as part-time activity.

Farms with higher gross margins i.e. over 1 million denars (€16,300) had a 10% share in 2001, compared to the relatively low share of 5% in years 2005-2009.

Table 12. Number of FMS farms in terms of GM per farm in denars

Farm gross margin	2001	2005	2006	2007	2008	2009
<100,000 denars	67	124	110	77	79	152
<200,000 denars	81	61	38	58	50	100
<300,000 denars	50	45	23	32	42	43
<400,000 denars	48	34	22	21	24	41
<500,000 denars	45	18	13	16	14	23
<600,000 denars	33	11	10	11	11	16
<700,000 denars	23	5	8	8	3	13
<800,000 denars	13	6	5	4	6	9
<900,000 denars	9	2	7	3	3	3
<1,000,000 denars	7	7	1	2	2	10
≥1,000,000 denars	<u>40</u>	<u>9</u>	<u>9</u>	<u>8</u>	<u>10</u>	<u>9</u>
All farms	416	322	246	240	244	419

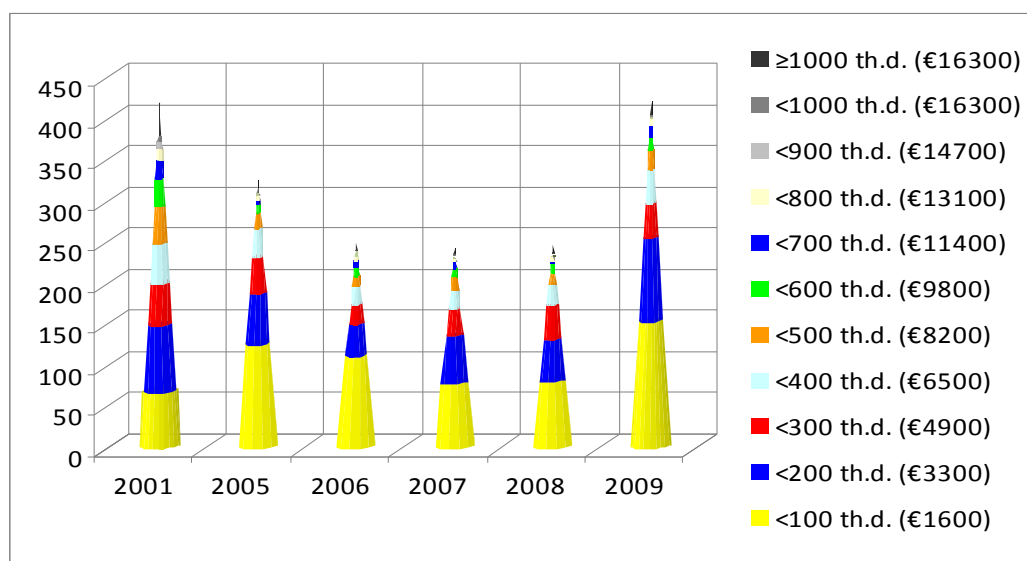


Figure 15. Number of FMS farms in terms of GM per farm in thousand denars (th.d) and euros

Farm output value

The gross farm output value in the FMS sample in general has declined over the course of years by 13%, from 640,000 denars in 2001 to 565,429 denars in 2009. The sharp fall of the output value was noted in the regions of Tetovo, Strumica and Kumanovo, whereas the output per farm has increased in Skopje, Bitola and Stip regions (see Table 13). Analyzed by type of farming, the farm output value is being highest for sheep, mixed farms and cattle farms. In the period from 2001 to 2009, the cattle, cereals, sheep and mixed farms had their output value almost halved, while some increase was noted for fruit and grape-growing farms (Table 14). In terms of farm size the highest fall of farm output value was for farms with 5-10 hectares and those with over 15 hectares (Table 15). In the period 2005 to 2009, analyzed by economic farm size groups, the farm output value decreased over time (Table 16).

Table 13⁷. Farm output value per region

Region	2001 (1)	2005 (2)	2009 (3)	Period 2005-09 (4)	(2)/(1)	(3)/(1)
BIT	631,000	815,577	736,311	724,456	1.29	1.17
KUM	634,000	612,894	488,410	516,211	0.97	0.77
SKP	549,000	480,538	716,871	571,639	0.88	1.31
STIP	500,000	538,400	563,468	470,005	1.08	1.13
STR	465,000	535,063	345,060	507,741	1.15	0.74
TET	1,110,000	796,773	310,819	424,160	0.72	0.28
Average farm	649,000	634,527	565,429	559,881	0.98	0.87

Table 14. Farm output value per type of farming

Type of farming	2001 (1)	2005 (2)	2009 (3)	Period 2005-09 (4)	(2)/(1)	(3)/(1)
Cattle	1,467,000	859,377	674,026	628,756	0.59	0.46
Cereals	399,000	162,944	201,615	352,191	0.41	0.51
Fruit	436,000	743,216	554,082	566,243	1.70	1.27
Grapes	197,000	237,233	235,963	250,266	1.20	1.20
Mixed farm	741,000	733,952	849,101	674,885	0.99	1.15
Mixed crop	444,000	423,486	324,844	385,241	0.95	0.73
Sheep	1,832,000	1,381,300	1,315,129	1,133,083	0.75	0.72
Vegetables	499,000	602,436	512,806	595,790	1.21	1.03
Mixed livestock	1,141,000	/	799,550	753,940	/	0.70
Average farm	649,000	634,527	565,429	559,881	0.98	0.87

Table 15. Farm output value by farm size (ha groups)

Farm size	2001 (1)	2005 (2)	2009 (3)	Period 2005-09 (4)	(2)/(1)	(3)/(1)
<2 ha	521,000	471,211	469,603	409,961	0.90	0.90
2-5 ha	529,000	563,339	507,542	549,402	1.06	0.96
5-10 ha	1,189,000	756,154	685,168	712,712	0.64	0.58
10-15 ha	1,360,000	1,430,880	1,459,684	1291,355	1.05	1.07
>15 ha	1,396,000	2,977,057	1,069,191	2,055,979	2.13	0.77
Average farm	649,000	634,527	565,429	559,881	0.98	0.87

⁷ All figures reported in tables 13 to 30 are expressed in denars.

Table 16. Farm output value by farm size (ESU groups)

FS six groups	2005 (1)	2007 (2)	2009 (3)	Period 2005-09 (4)	(2)/(1)	(3)/(1)
VSF1	256,249	107,076	242,247	218,238	0.42	0.95
VSF2	503,202	270,384	465,632	428,329	0.54	0.93
SF	785,462	513,255	748,764	714,877	0.65	0.95
MLF1	1,744,983	829,918	1,237,899	1,150,822	0.48	0.71
MLF2	3,087,333	1,214,460	1,554,594	1,755,409	0.39	0.50
MHF	3,584,522	2,157,178	3,347,382	3,340,276	0.60	0.93
Average farm	634,527	445,305	565,429	559,881	0.70	0.89

Note: FS: farm size

Farm specific costs

The farm-specific costs have also declined over the course of years by 17%, from 367,000 denars in 2001 to 305,592 denars in 2009. Following the sharp fall in farm output value, the farm specific costs have also decreased in the regions of Tetovo, Strumica and Kumanovo, and consequently increased in Skopje, Bitola and Stip regions (see Table 17). Analyzed by type of farming, some increase of the specific costs was noted only for fruit and mixed farms. Highest costs occur for sheep, industrial crops, cattle, vegetable and mixed farms, whereas grapes farms are characterized with lowest costs per farm (Table 18). In terms of farm size (expressed in hectares), increase of the farm specific costs was recorded for larger farms than 10 hectares (Table 19). In the period 2005 to 2009, analyzed by economic farm size (ESU) groups, the farm-specific costs follow a steady decreasing trend (Table 20).

Table 17. Farm specific costs per region

Region	2001 (1)	2005 (2)	2009 (3)	Period 2005-09 (4)	(2)/(1)	(3)/(1)
BIT	361,000	472,067	397,036	380,922	1.31	1.10
KUM	342,000	322,145	279,355	279,511	0.94	0.82
SKP	344,000	254,955	362,352	278,003	0.74	1.05
STIP	254,000	356,886	329,254	259,992	1.41	1.30
STR	311,000	300,712	181,274	262,336	0.97	0.58
TET	588,000	587,606	183,715	266,560	1.00	0.31
Average farm	367,000	375,204	305,592	295,929	1.02	0.83

Table 18. Specific costs per type of farming

Type of farming	2001 (1)	2005 (2)	2009 (3)	Period 2005-09 (4)	(2)/(1)	(3)/(1)
Cattle	873,000	582,495	557,311	429,288	0.67	0.64
Cereals	209,000	95,993	143,266	177,523	0.46	0.69
Fruit	186,000	415,277	248,778	252,544	2.23	1.34
Grapes	264,000	60,594	116,188	96,073	0.23	0.44
Mixed farm	364,000	400,132	409,035	336,927	1.10	1.12
Mixed crop	228,000	230,650	147,520	182,343	1.01	0.65
Sheep	1,480,000	1,029,709	709,710	692,340	0.70	0.48
Vegetables	285,000	274,347	208,106	268,797	0.96	0.73
Mixed livestock	521,000	/	476,899	445,497	/	0.92
Average farm	367,000	375,204	305,592	295,929	1.02	0.83

Table 19. Specific costs by farm size (ha groups)

Farm size	2001 (1)	2005 (2)	2009 (3)	Period 2005-09 (4)	(2)/(1)	(3)/(1)
<2 ha	333,000	311,587	242,088	216,207	0.94	0.73
2-5 ha	294,000	323,159	241,923	266,196	1.10	0.82
5-10 ha	606,000	406,293	414,843	397,917	0.67	0.68
10-15 ha	615,000	672,248	969,726	780,825	1.09	1.58
>15 ha	652,000	1,603,734	690,427	1,165,093	2.46	1.06
Average farm	367,000	375,204	305,592	295,929	1.02	0.83

Table 20. Farm-specific costs by farm size (ESU groups)

FS six groups	2005 (1)	2007 (2)	2009 (3)	Period 2005-09 (4)	(2)/(1)	(3)/(1)
VSF1	214,429	53,073	210,966	181,846	0.25	0.98
VSF2	285,253	100,729	261,750	222,703	0.35	0.92
SF	381,020	193,382	340,239	317,843	0.51	0.89
MLF1	1,026,715	337,031	547,661	498,798	0.33	0.53
MLF2	2,058,824	460,618	541,454	825,884	0.22	0.26
MHF	1,687,314	935,141	1,280,118	1,497,978	0.55	0.76
Average farm	375,204	180,476	305,592	295,929	0.48	0.81

Note: FS: farm size

Farm gross margin

The average farm gross margin in 2001 was 282,000 denars, and has decreased to 259,837 denars in the FMS sample in 2009 (the average for the 2005-2009 being 263,952). The average gross margins of farms in the sample, region-wise, have shown certain changes over the period 2001-2009. The highest farm gross margin of 522,000 denars was in the Tetovo region in 2001, followed by 354,519 denars in 2009 in the Skopje region. In the period 2005-2009 highest gross margins are met at the farms in the Bitola, Skopje and Strumica region (Table 21). In terms of farm type, the gross margins of cattle farms and cereal farms have declined substantially over the course of the years. Increase in the farm gross margins was noted at grapes, sheep, vegetable and fruit farms. Grape farms had negative gross margin in 2001, while in 2005 and 2009 this type of farms realized positive gross margin of 179,639 denars in 2005 and 119,775 denars in 2009 (Table 22). The farm gross margin per farm size groups – in terms of farm economic size – is understandably higher for larger farms; ranging from 31,281 thousand denars for very small farms (with less than 2 ESU) to over 2 million denars for medium-high size farms in 2009 (Table 24).

Table 21. Gross margin per farm per region

Region	2001 (1)	2005 (2)	2009 (3)	Period 2005-09 (4)	(2)/(1)	(3)/(1)
BIT	270,000	343,510	339,275	343,535	1.27	1.26
KUM	292,000	290,749	209,055	236,700	1.00	0.72
SKP	206,000	225,583	354,519	293,636	1.10	1.72
STIP	246,000	181,514	234,214	210,013	0.74	0.95
STR	154,000	234,351	163,786	245,405	1.52	1.06
TET	522,000	209,167	127,104	157,600	0.40	0.24
Average farm	282,000	259,323	259,837	263,952	0.92	0.92

Table 22. Gross margin per type of farming

Type of farming	2001 (1)	2005 (2)	2009 (3)	Period 2005-09 (4)	(2)/(1)	(3)/(1)
Cattle	594,000	276,882	116,715	199,468	0.47	0.20
Cereals	190,000	66,951	58,349	174,668	0.35	0.31
Fruit	250,000	327,938	305,303	313,699	1.31	1.22
Grapes	-66,000	176,639	119,775	154,194	/ *	/ *
Mixed farm	480,000	333,820	440,066	337,958	0.70	0.92
Mixed crop	215,000	192,836	177,324	202,898	0.90	0.82
Sheep	352,000	351,591	605,420	440,743	1.00	1.72
Vegetables	214,000	328,089	304,700	326,993	1.53	1.42
Mixed livestock	621,000	/	322,651	308,444	/	0.52
Average farm	282,000	259,323	259,837	263,952	0.92	0.92

Note: ratios are not calculated for grape farms, since in 2001 the grape farms gross margin was negative.

Table 23. Gross margin by farm size (hectare groups)

Farm size	2001 (1)	2005 (2)	2009 (3)	Period 2005-09 (4)	(2)/(1)	(3)/(1)
<2 ha	188,000	159,624	227,515	193,753	0.85	1.21
2-5 ha	235,000	240,180	265,619	283,206	1.02	1.13
5-10 ha	584,000	349,861	270,325	314,795	0.60	0.46
10-15 ha	745,000	758,632	489,958	510,531	1.02	0.66
>15 ha	744,000	1,373,322	387,630	890,886	1.85	0.51
Average farm	282,000	259,323	259,837	263,952	0.92	0.92

Table 24. Gross margin per farm by farm size (ESU groups)

FS six groups	2005 (1)	2007 (2)	2009 (3)	Period 2005-09 (4)	(2)/(1)	(3)/(1)
VSF1	41,820	54,003	31,281	36,391	1.29	0.75
VSF2	217,949	169,655	203,883	205,626	0.78	0.94
SF	404,442	319,872	408,525	397,033	0.79	1.01
MLF1	718,268	492,888	690,238	652,024	0.69	0.96
MLF2	1,028,509	753,842	1,013,140	929,524	0.73	0.99
MHF	1,897,208	1,222,037	2,067,265	1,842,297	0.64	1.09
Average farm	259,323	264,828	259,837	263,952	1.02	1.00

The indicator of farm gross margin per hectare of UAA is stable on average farm level, if seen as an index 2009/2001, ranging from 78,000 denars in 2001 to 86,406 denars in 2005. A noteworthy decrease occurred in the Kumanovo region, while it has increased most significantly in the Skopje region (Table 25). Farms with more hectares have experienced average decrease in their gross margins (Table 26), similarly to the farms belonging to the very small farms group of less than 2 ESU (Table 27).

Table 25. Gross margin per hectare per region

Region	2001 (1)	2005 (2)	2009 (3)	Period 2005-09 (4)	(2)/(1)	(3)/(1)
BIT	76,000	84,655	71,162	89,309	1.11	0.94
KUM	54,000	50,300	31,343	39,165	0.93	0.58
SKP	86,000	122,335	134,722	102,550	1.42	1.57
STIP	53,000	95,218	61,463	70,666	1.80	1.16
STR	71,000	120,859	83,977	105,757	1.70	1.18
TET	152,000	185,523	116,895	152,315	1.22	0.77
Average farm	78,000	86,406	79,738	84,942	1.11	1.02

Table 26. Gross margin by farm size (hectare groups)

Farm size	2001 (1)	2005 (2)	2009 (3)	Period 2005-09 (4)	(2)/(1)	(3)/(1)
<2 ha	169,000	247,054	262,473	296,603	1.46	1.55
2-5 ha	68,000	80,635	84,360	92,438	1.19	1.24
5-10 ha	82,000	55,780	42,333	48,229	0.68	0.52
10-15 ha	61,000	68,256	43,023	45,498	1.12	0.71
>15 ha	33,000	56,125	15,246	34,021	1.70	0.46
Average farm	78,000	86,406	79,738	84,942	1.11	1.02

Table 27. Gross margin per hectare by farm size (ESU groups)

FS six groups	2005 (1)	2007 (2)	2009 (3)	Period 2005-09 (4)	(1)/(2)	(3)/(1)
VSF1	29,268	30,620	11,768	19,408	1.05	0.40
VSF2	77,409	73,851	80,836	81,562	0.95	1.04
SF	90,826	102,490	104,981	95,373	1.13	1.16
MLF1	101,104	112,531	152,343	124,047	1.11	1.51
MLF2	418,093	121,119	71,810	135,512	0.29	0.17
MHF	139,641	228,760	384,525	164,116	1.64	2.75
Average farm	86,406	94,214	79,738	84,942	1.09	0.92

Cross-region, economic size and farm type analysis of farm GM (2005-2009)

The variation of farm gross margin is the highest for the very small farms (VS1 class): farms in this class achieve the highest gross margin in the Kumanovo, Strumica and Skopje regions, and the lowest in the Stip region. The farm gross margins of VSF2 and SF classes do not vary significantly throughout the regions. Somewhat higher variation ranging from 12 to 18% is noted at the medium-low and medium-high classes of economic size (Table 28).

The variation is higher when average farm gross margins are analyzed by type of farming and by region. Seen by type of farming, highest variation occurred for cereal farms, with coefficient of variation of 128, and lowest variation is noted at fodder crop farms (Table 29).

Table 28. Average gross margin per region and farm economic size, 2005-09 (in thous. denars)

Regions/ FS groups	BIT	KUM	SKP	STIP	STR	TET	Average farm	St.dev.	CV
VSF1	35.8	43.8	41.5	22.2	41.6	30.6	36.4	7.6	20.78
VSF2	213.6	200.0	205.0	18.4	212.2	195.2	205.6	10.3	5.01
SF	395.6	391.4	410.3	406.9	389.9	375.0	397.0	11.6	2.93
MLF1	648.4	525.9	640.0	698.4	693.0	755.5	652.0	70.9	10.88
MLF2	930.7	666.9	1000.9	898.4	958.8	853.0	929.5	107.8	11.60
MHF	1640.1	1738.5	2044.5	1945.8	2172.2	1132.0	1842.3	339.7	18.44
Average farm	343.5	236.7	293.6	210.0	245.4	157.6	264.0	59.1	22.39

Notes: St.dev.: Standard deviation. CV: Coefficient of variation expressed as percentage of the mean.

Table 29. Average gross margin per region and farm type, 2005-09 (in thous. denars)

Regions/ Farm type	BIT	KUM	SKP	STIP	STR	TET	Average farm	St.dev.	CV
Cattle	108.7	178.2	275.3	157.0	-18.7	301.2	199.5	106.3	53.31
Cereals	96.8	192.1	708.4	120.7	130.3	53.1	174.7	223.7	128.06
Fodder crops	77.8	74.2	59.6	79.5	81.2	25.6	69.1	19.5	28.28
Fruit	404.9	/	228.1	63.7	182.8	79.7	313.7	123.1	39.24
Grapes	87.3	28.2	178.4	32.1	197.0	/	154.2	71.2	46.20
Industrial	222.8	/		75.5	156.5	/	200.0	60.2	30.11
Mixed crop	285.4	213.8	259.8	158.6	176.3	63.2	202.9	72.8	35.86
Mixed farm	494.2	275.6	304.8	391.6	85.3	177.8	338.0	133.5	39.50
Mixed livestock	257.8	217.8	53.3	221.2	278.1	185.1	308.4	116.0	37.61
Sheep	461.1	12.7	614.3	839.5	99.8	314.3	440.7	137.8	59.62
Vegetables	512.2	638.6	214.8	245.0	355.7	121.1	327.0	262.8	54.61
Average farm	343.5	236.7	293.6	210.0	245.4	157.6	264.0	178.6	22.39

Notes: St.dev.: Standard deviation. CV: Coefficient of variation expressed as percentage of the mean.

The total value of output on all farms included in the sample in the period 2005-2009 is highest for sheep, mixed livestock and cattle farms. Highest costs occur for sheep, industrial crops, cattle, vegetable and mixed farms; whereas grapes and pigs farms are characterized with lowest costs per farm (see Table 30). Highest crop-specific costs occur expectedly for vegetable and fruit farms, and highest livestock specific costs for sheep, cattle and mixed livestock farms. The highest gross margin per farm is observed for industrial crops farms (usually growing tobacco), followed by sheep and goat farms, and mixed farms. Vegetable and fruit farms also produce a gross margin that is noteworthy. The lowest gross margin is met at cereals and fodder crop farms.

Table 30. Per farm total specific costs, value of output and gross farm income 2005-09 (in thous. denars)

Category	Total value of output	Crop specific costs	Livestock specific costs	Total specific Costs	Farm gross margin
<i>FADN code</i>	<i>(SE131)</i>	<i>(SE285-305)</i>	<i>(SE310-330)</i>	<i>(SE281)</i>	<i>(SE131-SE281,</i>
Cattle	628.2	31.5	400.7	432.1	196.1
Cereals	377.5	11.1	87.3	198.0	179.5
Fodder crops	396.1	94.5	204.1	298.6	97.5
Fruit	555.1	24.4	1.4	244.9	310.2
Goats	502.9	12.1	143.3	155.4	347.5
Grapes	248.0	94.3	0.2	94.5	153.5
Industrial	582.7	160.0	103.9	263.9	318.8
Mixed crop	402.0	112.5	74.1	186.7	215.3
Mixed farm	667.8	85.2	262.0	347.1	320.7
Mixed livestock	75.4	47.2	398.3	445.5	308.4
Pigs	174.5	15.8	80.1	95.9	78.7
Sheep	1164.7	45.7	669.9	715.6	449.1
Vegetables	566.1	249.2	10.8	260.0	306.1
Average farm	559.9	120.2	175.7	295.9	264.0

Concentration results

The Lorenz curve plots of farm land, output, specific cost and gross margin (non-negative values) variables of the farms included in the sample show an unequal distribution, especially on the upper right corner of the distribution plot. It can be seen that this uneven distribution of farm land, output, specific cost and gross margin did not change significantly between years 2005 and 2009 (see Figures 16 to 19). For instance, if we take a closer look at the land concentration pattern at FMS farms in 2009 (Figure 16), we can note that around 30% of farm land is used by 70% of farms. This also implies that 30% of farms use 70% of the farm land. Further along the Lorenz curve, it can be noted that 60% of farm land is used by more than 90% of farms, which implies that around 10% of the farms use 40% of the farm land. The situation is similar with farm output, specific costs and gross margin, in both years.

Gini coefficients give values fluctuating around 0.55 in the case of farm output and farm gross margin, and slightly higher value of around 0.60 in the case of farm specific costs, thus indicating more unequal distribution.

The tables containing the concentration indicators are given in Appendix B.

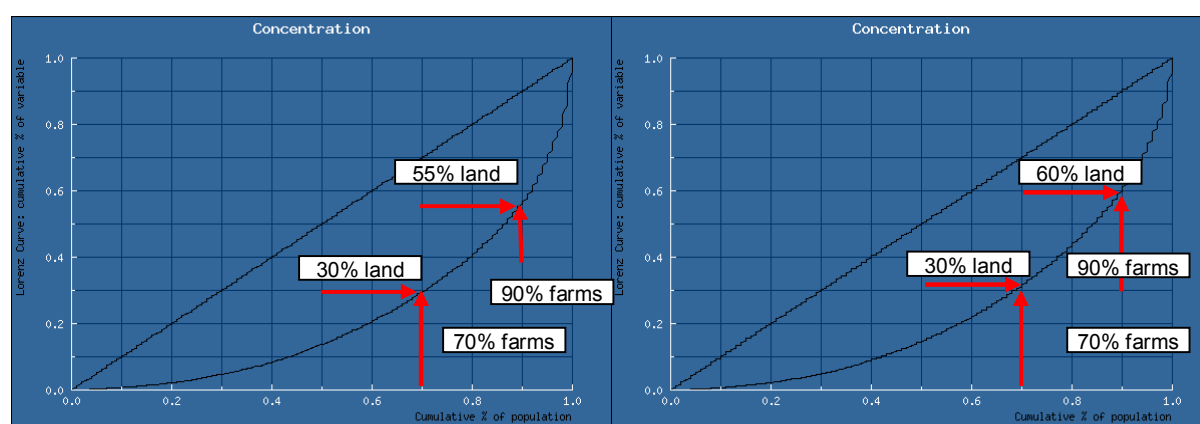


Figure 16. Lorenz curve of farm land utilised area of FMS farms in 2005 and 2009

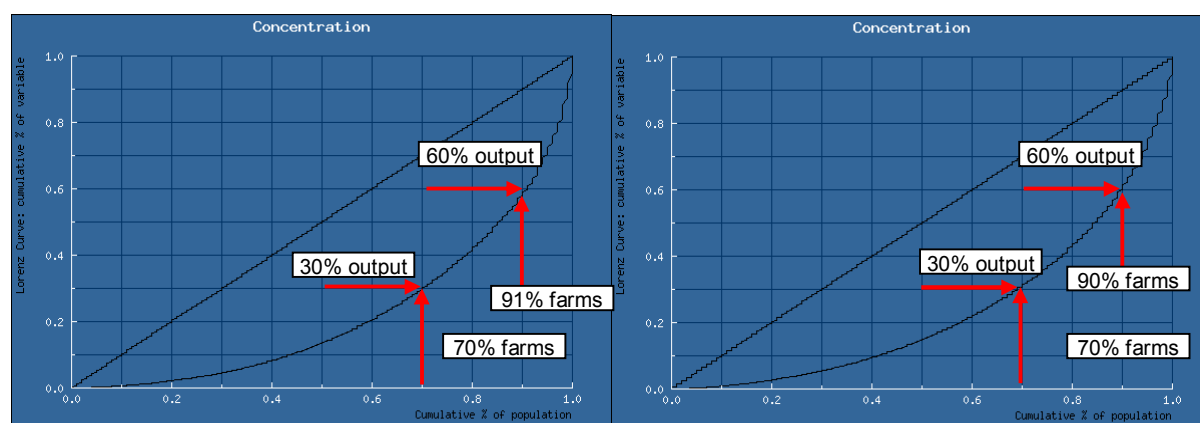


Figure 17. Lorenz curve of farm output of FMS farms in 2005 and 2009

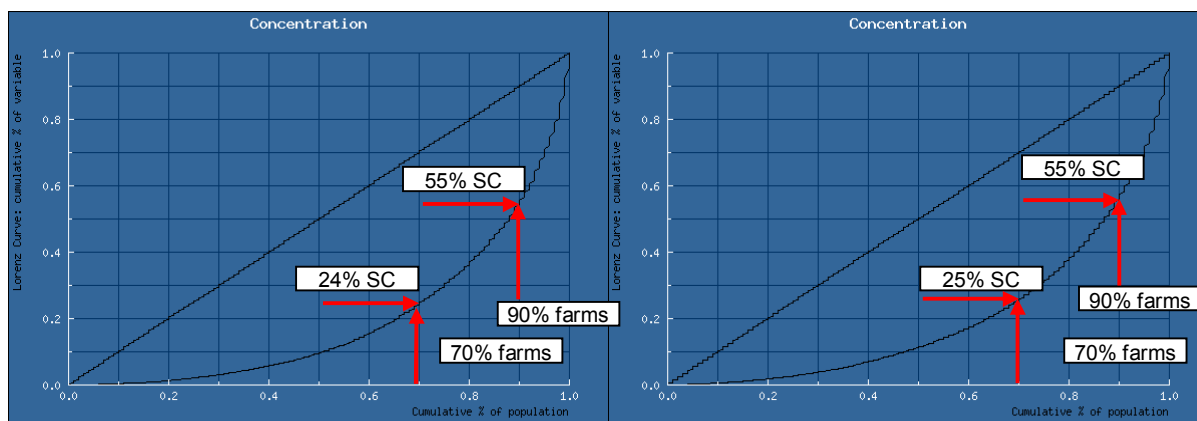


Figure 18. Lorenz curve of farm specific costs of FMS farms in 2005 and 2009

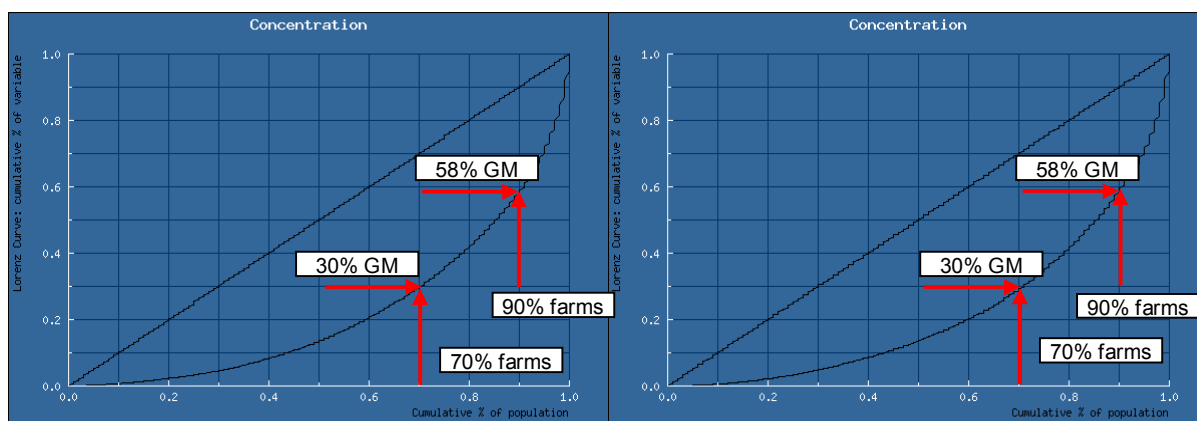


Figure 19. Lorenz curve of farm gross margin of FMS farms in 2005 and 2009 (non-neg. values)

Comparison of FMS sample results with EU countries in South-East Europe

The agricultural holdings in the European Union are on average more than seven times the size of the agricultural holdings in the Macedonian sample. The average economic size of EU farms in 2007 was 28.5 ESU, while the Macedonian match for the period 2005-09 was found to be 3.8 ESU. A previous study on a sample of Macedonian farms (Martinovska-Stojčeska *et al.*, 2008) determined it at 5.9 ESU in 2004. The average utilized agricultural area (UAA) per agricultural holding shows high variability among the 27 EU member countries; only the EU countries in South-East Europe are included in table 11. In this respect, the average UAA per farm is the highest in Hungary with 54.1 hectares and the lowest in Greece with 7 hectares in 2004. The average UAA derived from the Macedonian sample farms is 3.1 hectares per farm, which is higher than the official statistical mean of 1.37 hectare per farm (State Statistical Office, 2007), meaning that the farms included in the sample were larger than the average. The livestock units per agricultural holding in the EU in 2007 in average reach 25.5, whereas the Macedonian average equals 6.3 LU per holding.

The farms in the Macedonian sample reach lower wheat and maize yields per hectare than the EU average; according to the FMS data 2005-09, the Macedonian average is 3.2 t/ha for wheat and 5 t/ha for maize; compared to the EU average of 5.2 t/ha for wheat and 7.4 t/ha for maize, respectively.

Table 31. Comparison of FMS results with EU countries in South-East Europe (in euros)

	Economic size (ESU)	Utilised agricultural area UAA (ha)	Livestock units (LU)	Wheat yield (kg/ha)	Maize yield (kg/ha)	Gross Margin	Farm GM per ha UAA
<i>FADN code</i>	<i>(SE005)</i>	<i>(SE025)</i>	<i>(SE080)</i>	<i>(SE110)</i>	<i>(SE125)</i>	<i>(SE131-281)</i>	<i>(SE131-281/025)</i>
Bulgaria (2007)	8.1	25.3	8.3	2,074	1,236	12,246	483
Greece (2007)	10.8	7.0	4.4	2,918	11,630	14,246	2,024
Hungary (2007)	22.9	54.1	20.9	3,625	4,057	37,967	702
Romania (2007)	3.0	10.2	5.0	2,180	2,952	6,467	636
Slovenia (2007)	8.7	11.6	12.1	4,358	8,695	12,075	1,044
EU-27 (2007)	28.5	30.6	24.5	5,198	7,352	39,770	1,300
Macedonian sample (2005-09)	3.8	3.1	6.3	3,232	4,993	4,313	1,391

Source: FMS Survey 2005-2009 and own calculations based on the FADN public database

However, the farmers from the Macedonian sample got higher wheat yields than their counterparts in Bulgaria, Greece and Romania; and higher maize yields than farmers in Bulgaria and Romania (Sergo, 2010).

The gross margin at Macedonian farm holdings is significantly lower as compared to some of the countries that joined the EU in 2004 (such as Hungary) and closer to the countries that have joined in 2007 (e.g. Romania). Although this analysis lacks data about depreciation and external factors costs, previous studies argue that the margin between the gross farm income (SE410) and the farm net value added (SE415) in Macedonian conditions is small (Martinovska-Stojčeska *et al*, 2008). Namely, land is mostly owned by the farmers; family labour is dominant and seasonal labour is only occasionally hired; Furthermore, farmers are rarely using borrowed capital (only 1.46% of the total farms in the country prepared loan application business plan in the past decade; MAFWE, 2007). Macedonian farms achieve the lowest borrowed capital with an average loan per farm equal to €4,313, whereas the calculated EU-27 average in 2007 was €39,770 per farm.

4. CONCLUDING REMARKS

Having a farm accountancy data system that provides farm income information is, without any doubt, an important tool for policy analysis and evaluation. In this respect, the Farm Monitoring System (FMS) of the National Extension Agency provides valuable data to determine the economic and technical performances of Macedonian farms. The FMS is now officially providing data for the Macedonian network collecting accounting data from farms, as defined by Law in 2007. The objective of this network is to determine annual farm income, as well as to evaluate the conditions and situation in the agricultural sector and the markets of agricultural products.

The data from the FMS sample (2005-2009 period) provided relevant information to study the economic and technical performances of the private farms in the country. Nevertheless, the findings and conclusions of this analysis should be interpreted with caution, having in mind few limitations: (i) this analysis only concerns privately-owned individual farms; (ii) the quality of data collected during the FMS survey was subjected to a detailed check and data were corrected or interpolated where required, thus the results of this study may differ from other studies based on the same raw dataset; (iii) the results are based on the averages drawn only upon the farms included in the FMS sample, and at this stage were not extrapolated for the whole population of farms in the country; (iv) the farm fixed costs were not complete for all farms within the FMS data set and were therefore excluded; hence, the farm returns were calculated up to the gross farm margin level.

Based on the results dealing with the type of farming, mixed farms are an important segment of Macedonian agriculture, given that these farms are small and usually choose a diverse production structure with a wide range of products. Vegetable farms are represented with a relatively stable share, ranging from 11% in 2009 to 15% in 2005; grape-growing farms are present with a share gravitating around 7-8% in years 2001 and 2009 and 14% in 2005. Cattle farms have a steady share of 6-8% throughout the years.

Analysed by region, farms in Bitola are regarded as mixed farms, fruit (apple) farms and sheep farms. In Kumanovo the majority of the farms are mixed with, however, the existence of specialised cattle farms, cereals farms and sheep farms. Skopje farms are producing grapes as their main crop, since the Vardar basin river being the most important grape-growing area belongs to this region. The Stip region is very diversified, featuring mixed farms, grape-growing farms, followed by cattle farms, cereal farms and sheep farms. Strumica region is typical for vegetables. Tetovo region has a rather even structure of mixed farms, followed by cereals in the Polog plain and sheep farms.

The average number of hectares per FMS farm is around 3-3.5 ha, higher than the statistical average of 1.37 ha generated by the 2007 Census data (SSO, 2007). Most of the farms included in the FMS survey 2005-2009 belong to the very small farms category of economic size. The largest share of farms consists of those with farm gross margin of less than 2 ESU (VSF1). This structure remained stable throughout the years and no significant changes occurred.

The gross margins of the most important crops in the country generally decrease over the years. Overall, this situation comes mainly as a result of the increasing input prices, and decreasing producer prices. It is important to state that these gross margin results do not comprise the income from subsidies, which became an important component since 2004.

The average farm gross margin in 2001 was 282,000 denars, and has decreased to 259,837 denars in 2009 (the average for the 2005-2009 being 263,952). The highest farm gross margin of 522,000 denars was in the Tetovo region in 2001, followed by 354,519 denars in 2009 in the Skopje region. In the period 2005-2009 highest gross margins are met at the farms in the Bitola, Skopje and Strumica region. The highest gross farm margins are obtained for industrial crop farms (usually those growing tobacco), followed by sheep farms and mixed farms. Vegetable and fruit farms also produce a gross farm margin that is worth mentioning. The lowest gross farm margins occurred for cereal and fodder crop farms. The gross margins of cattle farms and cereal farms have declined substantially over the course of the years. Increase in the farm gross margins was noted for grape-growing, sheep, vegetables and fruit farms. The farm gross margin per farm size groups – measured in terms of farm economic size – is understandably higher for larger farms; ranging from 31,281 thousand denars for very small farms (with less than 2 ESU) to over 2 million denars for medium- to high size farms in 2009.

The concentration of farm land, output, specific costs, gross margin and farm ESU (non-negative values) are analyzed through the Lorenz curve and Gini coefficient which show an unequal distribution among all variables under study. This result did not change significantly between years 2005 and 2009. The Gini coefficients give values fluctuating around 0.55 in the case of farm output and farm gross margin, and slightly higher value of about 0.60 in the case of farm specific costs, thus indicating a more unequal distribution.

The agricultural holdings in the European Union are on average more than seven times the size of the agricultural holdings in the Macedonian sample. Macedonian farms reach lower wheat and maize yields than the EU average. The gross farm margin at Macedonian holdings is significantly lower as compared to some of the countries that joined the EU in 2004 and closer to the countries that joined in 2007.

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Index of tables

Table 1. Classification of farms by size, adopted by FADN	8
Table 2. Classification of farms by type, adopted by FADN	8
Table 3. Number of farms in the FMS survey per region	12
Table 4. Structure of farms by typology (number of farms)	15
Table 5. Structure of farms by economic farm size	17
Table 6. Structure of farms by farm size (ha of cultivable land)	18
Table 7. Size of farms by farm type (ha of cultivated land)	18
Table 8. Size of farms by farm type (livestock units - LU)	19
Table 9. Regional crop yields of selected fodder, cereal and industrial crops, in kg/ha	20
Table 10. Regional crop yields of selected fruits and vegetables, in kg/ha	21
Table 11. Gross margin calculation for some major crops 2001, 2005 and 2009	22
Table 12. Number of FMS farms in terms of GM per farm in denars	24
Table 13. Farm output value per region	25
Table 14. Farm output value per farm type	25
Table 15. Farm output value by farm size (ha groups)	25
Table 16. Farm output value by farm size (ESU groups)	26
Table 17. Farm specific costs per region	26
Table 18. Specific costs per farm type	26
Table 19. Specific costs by farm size (ha groups)	27
Table 20. Farm specific costs by farm size (ESU groups)	27
Table 21. GM per farm per region per region	27
Table 22. GM per farm type	28
Table 23. GM by farm size (ha groups)	28
Table 24. GM per farm by farm size (ESU groups)	28
Table 25. GM per ha per region	28
Table 26. GM per ha by farm size (ha groups)	29
Table 27. GM per ha by farm size (ESU groups)	29
Table 28. Average GM per region and farm economic size, 2005-09	29
Table 29. Average GM per region and farm type, 2005-09	25
Table 30. Per farm total specific costs, value of output and gross farm income 2005-09	30
Table 31. Comparison of FMS results with EU countries in South-East Europe	33

Index of figures

Figure 1. Regions as determined by NEA	
Figure 2. Regions as determined by SSO	10
Figure 3. The farm accountancy data flow in Macedonia.....	11
Figure 4. Total number of farms included, per region	13
Figure 5. Number of farms per farm type.....	16
Figure 6. Total number of farms included, per type of farm	16
Figure 7. Structure of farms, per region and typology.....	17
Figure 9. Average GM for some cereals	
Figure 10. Average GM of wheat, per regions	23
Figure 11. Average GM for some fruits	
Figure 12. Average GM of apple, per regions	23
Figure 13. Average GM for some vegetables	
Figure 14. Average GM of tomato, per regions	23
Figure 15. Number of FMS farms in terms of GM per farm.....	24
Figure 16. Lorenz curve of farm land utilised area of FMS farms in 2005 and 2009	31
Figure 17. Lorenz curve of farm output of FMS farms in 2005 and 2009	31
Figure 18. Lorenz curve of farm specific costs of FMS farms in 2005 and 2009	32
Figure 19. Lorenz curve of farm gross margin of FMS farms in 2005 and 2009.....	32

Index of appendices

A. Livestock unit calculations	40
B. Concentration measures.....	41
C. Extracts from FMS database	42

APPENDIX A. LIVESTOCK UNIT CALCULATIONS

Converting average number of animals to livestock units is done applying to this number a coefficient related to the category of animal. The coefficients are the following:

D22	Equines	0.8
D23	Calves for fattening	0.4
D24	Other cattle < 1 year	0.4
D25	Male cattle 1-2< years	0.7
D26	Female cattle 1-2< years	0.7
D27	Male cattle >= 2 years	1.0
D28	Breeding heifers	0.8
D29	Heifers for fattening	0.8
D30	Dairy cows	1.0
D31	Cull dairy cows	1.0
D32	Other cows	0.8
D38	Goats, breeding females	0.1
D39	Other goats	0.1
D40	Ewes	0.1
D41	Other sheep	0.1
D43	Piglets	0.027
D44	Breeding sows	0.5
D45	Pigs for fattening	0.3
D46	Other pigs	0.3
D47	Table chickens	0.007
D48	Laying hens	0.014
D49	Other poultry	0.03

As the number of animals is recorded in the FADN farm return multiplied by ten (except for poultry), the LU coefficients are divided by ten (except for poultry) in the following formulas : SE080, SE085, SE090, SE095, SE100, SE105.

Source: EUROSTAT

APPENDIX B. CONCENTRATION MEASURES

B1. Concentration of farm output of FMS farms in 2005 and 2009

Measure	2005	2009
Entropy	5.186172	5.517000
Maximum Entropy	5.774552	6.037871
Normalized Entropy	0.898108	0.913733
Exponential Index	0.005593	0.004018
Herfindahl Index	0.009757	0.006402
Normalized Herfindahl	0.006672	0.004025
Gini Coefficient	0.555806	0.533738
Concentration Coefficient	0.557538	0.535015
Number of observations	322	419

B2. Concentration of farm specific costs of FMS farms in 2005 and 2009

Measure	2005	2009
Entropy	5.078061	5.397806
Maximum Entropy	5.774552	6.037871
Normalized Entropy	0.879386	0.893992
Exponential Index	0.006232	0.004526
Herfindahl Index	0.010258	0.007200
Normalized Herfindahl	0.007175	0.004825
Gini Coefficient	0.612803	0.591765
Concentration Coefficient	0.614712	0.593181
Number of observations	322	419

B3. Concentration of farm gross margin of FMS farms in 2005 and 2009

Measure	2005	2009
Entropy	5.124481	5.359974
Maximum Entropy	5.710427	5.958425
Normalized Entropy	0.897390	0.899562
Exponential Index	0.005949	0.004701
Herfindahl Index	0.010246	0.008569
Normalized Herfindahl	0.006958	0.006001
Gini Coefficient	0.555794	0.557824
Concentration Coefficient	0.557640	0.559269
Number of observations	302	387

B4. Concentration of farm utilised area (hectares) of FMS farms in 2005 and 2009

Measure	2005	2009
Entropy	5.043888	5.362610
Maximum Entropy	5.652489	5.908083
Normalized Entropy	0.892330	0.907674
Exponential Index	0.006449	0.004689
Herfindahl Index	0.011113	0.008060
Normalized Herfindahl	0.007631	0.005357
Gini Coefficient	0.562414	0.536665
Concentration Coefficient	0.564394	0.538127
Number of observations	285	368

APPENDIX C. EXTRACTS FROM FMS SAMPLE DATABASE

- C1. Crop capacities of FMS farms (per region, TF and economic size) in ha**
- C2. Crops included in FMS survey, all regions in ha**
- C3. Livestock capacities of FMS farms (per region, TF and economic size) in LU**
- C4. Crop yields average (2005-2009) in kg/ha**
- C5. Crop producer price average (2005-2009) in denars/ha**
- C6. Crop gross margin average (2005-2009) in denars/ha**
- C7. Average farm income (2005-2009) in denars**
- C8. Average farm specific costs (2005-2009) in denars**
- C9. Average farm gross margin (2005-2009) in denars**