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Effects of rural non-farm employment on economic vulnerability and income distribution of small farms in Croatia

Judith Möllers and Gertrud Buchenrieder

Leibniz Institute of Agricultural Development in Central and Eastern Europe (IAMO)
Theodor-Lieser Str. 2, 06120 Halle (Saale), email: moellers@iamo.de

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Abstract - Rural non-farm employment (RNFE) is thought to curtail increases in rural poverty and income inequality. In the Croatian context three key questions arise: (1) Does the uptake of alternative employment actually help to raise the welfare of small family farms? (2) How is the rural income distribution affected by mixed income structures? (3) Will non-farm diversification rather trigger farm exit or inhibit structural change because a large number of tiny farms persist? In this paper we present results on the effect of RNFE on the income structure and inter-household income distribution among Croatian family farms. The analysis draws on a survey of 175 randomly selected family farms in two Croatian regions in 2007. The poorest farm households have little access to land, and – although dependent on farming incomes they cannot live from agriculture alone. The better-off farms receive significantly higher incomes per hectare of land. RNFE affects rural livelihoods positively in two ways: it is the most important income source of middle income farms, and is found to be an important catalyst that helps smoothing income inequality in the rural context.

Keywords: rural non-farm employment, rural poverty, Croatia, income distribution

JEL Codes: Q12, P25, O15, O18

1 INTRODUCTION

The ongoing transition process in Eastern and Southeastern Europe offers new economic opportunities and employment options to the rural population. However, the majority has experienced the reform process rather as a shock which brought inflation, unemployment, and a loss of lifetime savings. Unequivocally, transition produced an initial increase in poverty levels as well as a higher inequality of income distribution. Recent years, however, have seen a declining trend in poverty, though very few transition countries have been successful in creating enough jobs to fully replace those that have been lost.

On average, 16% of the EU27 population were at risk of poverty in 2006, i.e. living in households with a disposable income below 60% of the median income of the country they live in. The highest relative poverty rates of 20% or more are found in Greece, Italy, Spain, Lithuania and Latvia, whereas the share of the population at risk of poverty is only 10% in the Czech Republic and the Netherlands (EUROSTAT 2009). Croatia had a poverty rate of 18% in 2003 according to EUROSTAT (2009). Compared to other south-eastern European countries (e.g. Albania, Romania or Bulgaria) Croatia is well off, and the level of absolute poverty is low¹. However, there are large regional differences. Generally, rural areas face a higher level of relative and absolute poverty, and this trend has even become stronger. One-person households face the highest risk of rural poverty—about 3.5 times the national average risk—followed by two-person rural households—with twice the national average risk (WORLD BANK 2006). Furthermore, there are indications that specifically small family farms – about three thirds in the farming sector are self-employed farmers and 95% of all family farms work on less than 10 hectares of land - are vulnerable in terms of poverty risk (NESTIĆ and VECCHI 2007).

The question arises how these small farms can cope with the ongoing structural changes, and if rural non-farm employment (RNFE) could be a key to sustain their livelihoods. The persistence of rural poverty is one of the reasons why current rural development approaches adopt a more comprehensive view of the diversity of rural areas and particularly the multiplicity of income sources that rural households depend on (OECD 2006, WORLD BANK 2007). Farm-based households pursue non-farm strategies because they lack access to sufficient agricultural land and because they seek additional incomes to diversify risks (DE JANVRY and SADOULET 2001). In developing countries, detailed analyses of rural income sources have revealed the tremendous importance of non-farm employment and income (REARDON *et al.* 1998 and 2007). Yet for transition countries empirical evidence is still patchy.² In order to promote broader concepts of rural development (e.g. in the EU's rural policies towards its accession and candidate countries), a better understanding of the levels and composition of non-farm income and its implications for poverty and inequality is essential.

Croatia has demonstrated a growing interest in poverty related topics recently. A WORLD BANK study (2006), which is based on the national household budget surveys (2002 - 2004), gives – for the first time – a comprehensive overview. This paper intends to add to this by providing insights that specifically refer to the situation of small family farms. It draws on a

¹ Absolute poverty is commonly defined as the lack of material or financial resources necessary for survival or meeting basic needs, while relative poverty refers to an exclusion from a way of life deemed to be minimally decent or acceptable in a society in which someone lives (Matkovic 2007).

² This is certainly a reason why the Journal of Agricultural Economics has devoted one of its 2009-issues to this topic with a couple of contributions on transition economies.

survey of 175 randomly selected farm households³ in two Croatian regions. The research questions are: (1) How important are non-farm incomes for small family farms in Croatia? (2) How do non-farm income sources affect household welfare and income inequality? (3) Will non-farm diversification rather trigger farm exit or inhibit structural change because a large number of tiny farms persist? Beside standard poverty measures, decomposed Gini-coefficients are used to analyse the effect of non-farm employment on income distribution. The calculation of Gini elasticities allows describing the marginal contribution of different income sources to inequality. Furthermore, we discuss the issue of future development of agricultural holdings by analysing statements of farmers concerning their medium-term plans with regard to their farms.

2 RNFE IN THE CONTEXT OF POVERTY ALLEVIATION AND INCOME DISTRIBUTION

Despite considerable economic growth, Croatia has seen a slow job creation process and its employment rate is one of the lowest in Europe. Particularly the long term unemployment rate is high. Although the poverty risk in Croatia is comparably low, headcount poverty rates vary across regions from less than 3% to more than 20%; also between urban and rural areas a wide gap in the headcount ratios exists. In rural areas, poverty risk increases for self-employed, i.e. mostly individual farmers. Generally, household size, education, age and employment status are important correlates of poverty (WORLD BANK 2006, NESTIĆ and VECCHI 2007).

As agricultural employment is generally associated with an elevated poverty risk, RNFE may offer an escape from this situation (ALAM *et al.* 2005). Looking at the relationship of RNFE and poverty reduction, we must first underscore that RNFE is very diverse (LANJOUW 2007). It is often “highly lucrative at the top end with mainly formal wage-employment and modern capitalized enterprises, but very menial at the bottom end, where traditional artisan skills and poorly paid manual labour predominate” (START 2001, p. 496). RNFE can be important for both poor and rich households. Yet, the rich often dominate lucrative business niches. The poor, lacking access to capital, education, and infrastructure, are not the main beneficiaries of non-farm income (WORLD BANK 2007). In accordance with this, two directions of non-farm diversification have been identified: demand-pull and distress-push processes (c.f. EFSTRATOGLU 1990, BARRETT *et al.* 2001, REARDON *et al.* 2007). The term “demand-pull” is used to describe a situation in which those employed in agriculture seize more lucrative employment opportunities in the rural non-farm sector. The term “distress-push” describes a situation in which inadequate agricultural incomes and other negative factors push workers into poorly paid RNFE. This is, in part, because of the differential access to high-skill and low-skill jobs. Uneducated adults are more likely to be working in the farming sector. Better educated adults are more likely to have non-farm wage jobs. Also older cohorts are less likely to be working in non-agricultural wage employment than younger cohorts (WORLD BANK 2007). From an economic point of view, it is important to know how these processes affect poverty. MÖLLERS and BUCHENRIEDER (2005) present a welfare model demonstrating that, in theory, both directions have the potential to reduce poverty. Benefits not only arise for demand-pull shifters whose incentive to engage in RNFE are higher wages, but also for distress-push shifters: Poor farm families are typically characterized by low or zero opportunity costs with regard to farm work (“disguised unemployment”). As long as the

³ The terms *household* and *family* are used interchangeably.

aggregate household income is raised by a shift of farm labour to the non-farm sector, there is an economic rationale to do so even if non-farm work has a low wage rate. Thus, RNFE is expected to reduce rural poverty. Nonetheless, many stories about growth in the non-farm sector driving down rural poverty do not survive close scrutiny. The relationship between poverty and non-farm employment may be more subtle than initial impression may suggest. Therefore, simple causal conclusions should not be drawn (LANJOUW 2007).

As opposed to poverty reduction, the effect of farm and non-farm employment on income inequality is less obvious. It seems as if the way in which push and pull factors interact with a region's endowment leads to a number of specific patterns that relate the amount of non-farm income to the total family income (DEININGER and OLINTO 2001). REARDON *et al.* (1998) present different hypotheses that are discussed in the literature. On the one hand, RNFE could have a positive effect on income distribution. This hypothesis is based on the idea that rural families that cannot use their labour force to capacity will enter the non-farm sector. On the other hand, the distribution effect could favour wealthier groups if those with better capital endowment are also those with better access to RNFE. This is probable when employment in the non-farm sector requires specialised knowledge, capital and social networks (LANJOUW and FEDER 2001). Accordingly, the first hypothesis assumes a linear decreasing curve of the share of non-farm incomes from the poorer to the better-off families, whereas the second hypothesis assumes an increasing curve (ELLIS 2000). LANJOUW and LANJOUW (1997) argue that empirical studies rather find u-shaped relationships between non-farm incomes and total incomes, meaning that particularly the poorest and richest households are involved in RNFE. REARDON *et al.* (2000) state that such u-shaped relationships typically occur if a region offers low-wage employment opportunities that are often accompanied by favourable infrastructures, high population density and a dynamic agricultural sector. If the preconditions are less favourable, they expect a decreasing linear relationship.

3 BRIEF INTRODUCTION OF THE SAMPLE AND ANALYTICAL METHODS

This paper is based on a farm household survey conducted in spring 2007 (for more details see MÖLLERS *et al.* 2009). The main objective of this empirical work was to fill existing gaps concerning socio-economic characteristics of Croatian farms in view of the negotiation of the Agricultural Chapter with the EU. The results are not nationally representative; however, they offer highly detailed and otherwise not available insights into Croatia's family farms. Important for the comparability of the country data is the definition of regional boundaries within which the survey took place. It was agreed with the Croatian partners⁴ to choose two distinct regions with different employment opportunities: (1) Zagreb County represents a region with a more peri-urban character and thus with better opportunities with regard to markets and particularly non-farm employment and (2) Bjelovar-Bilogora County is a typical rural, poorer region. The choice of regions is based on the administrative unit of counties which roughly reflect the NUTS-3-level as used in the EU. All income data refer to the year 2006.

Zagreb County is situated in the central part of Croatia forming a ring around the capital city Zagreb. About 7% of the Croatian population live in this county, almost 70% of them in rural

⁴ The Croatian partners who were member of the project consortium came from the Croatian Chamber of Commerce (leader of the negotiation of the Agricultural Chapter), the University of Zagreb, the Ministry of Agriculture, Forestry and Water Management and the Ministry of Foreign Affairs and European Integration.

settlements. The share of farm households in all households is about 40%, but only 12% of the work force are officially registered as farmers. Farm sizes are also small in Zagreb County; more than 40% of the family farms cultivate up to one hectare and are hardly market-oriented, whereas 4.4% utilise more than 10 hectares accounting for about one quarter of the farm land available in this county. The rural non-farm sector is based on the county's high potential for tourism, crafts and small and medium sized enterprises in the direct vicinity of the capital. The number of interviews in both counties was 175. The rural region of Bjelovar-Bilogora is situated in the north-western part of the country. It is home to about 3% of the Croatian population and about half of the households in the county are involved in agriculture. 70% of the working population is engaged in farming. Small-scaled family farms prevail; the average farm size is only 3.4 hectares and only 10% of the farms have access to 10 or more hectares. Major industries of Bjelovar-Bilogora County include food processing as well as some construction business and metallurgy industries. The county is among those with the highest poverty rates and the highest proportion of employment in agriculture in Croatia (WORLD BANK 2006).

The analysis focuses on the effect of RNFE on poverty and inter-household income inequality. Poverty is measured by three standard poverty measures, (1) the *headcount index*, (2) the *poverty deficit index*, and (3) the *poverty severity index* (FOSTER *et al.* 1984). Relative poverty lines used for the calculation are based on 60% of the median income. The three poverty measures by FOSTER *et al.* (1984) are described by

$$(1) \quad P(\alpha) = \frac{1}{n} \sum_{i=1}^m \left[\max \left(\frac{z - c_i}{z}, 0 \right) \right]^\alpha,$$

where z is the poverty line, c_i is the income of the individual i , n is the total number of individuals and m is the number of poor individuals. The parameter α changes depending on the poverty measure. If α is set equal to 0, we obtain $P(0)$, that is, the *headcount index* indicating the share of poor below the poverty line. $P(1)$ displays the *poverty deficit*, a measure that takes into account how far the poor, on average, fall below the poverty line. Finally, if α is set equal to 2, we obtain $P(2)$, called the *poverty severity* measure, which captures the difference in the severity of poverty by giving more weight to the poorest. Thus, *poverty severity* considers income differences better. A poverty risk index is compiled by comparing poverty measures of certain groups of a population in relation to the total population (WORLD BANK 2000a, COUDOUÉL *et al.* 2000).

Poverty analyses often refer to adjusted household sizes and are used to calculate per capita incomes considering economies of scale. Economies of scale arise in many ways in a family, for example by sharing certain expenditures such as housing or a car. There are different methods for estimating equivalence scales. We use a class of equivalence scales which can be described by the following formula:

$$(2) \quad \text{Equivalent Size} = (\text{Adults} + \text{Children})^\theta$$

where θ is a parameter between 0 and 1 to be chosen or estimated. We set the equivalence scale θ to 0.53. This figure reflects the OECD-II equivalence scale which is widely used by Eurostat in calculating comparable income, poverty and social exclusion indicators for EU countries ("Laeken" indicators). It assigns the coefficient 1 to the first adult household member, 0.5 to other adults in the household, and 0.3 to children under the age of 15.

The effect of certain income sources on income distribution can be determined by Gini coefficients⁵ in two ways (REARDON *et al.* 2000). The most common method is a comparison of a Gini coefficient for all incomes with another Gini coefficient that is calculated excluding the income source of interest (e.g. non-farm incomes). If the latter is smaller (bigger) than the Gini based on total income, this income source has a negative (positive) effect on the income distribution. In addition, decomposition according to different income sources allows conclusions regarding the relative distribution effect of certain sources. The contribution of each income source is the product of a concentration coefficient for that income source and the fraction of that income source in total income (SHORROCKS 1982, WORLD BANK 2000a). Formally G_k^* , the concentration coefficient for income component k , is given by

$$(3) \quad G_k^* = \frac{2}{\mu n^2} \sum_{i=1}^n \left(r_i - \frac{n+1}{2} \right) y_{k,i} ,$$

where $y_{k,i}$ is the component k of the income of household i . The mean total income is denoted by μ ; r_i is the household's i rank in the ranking of all incomes. The Gini coefficient is a weighted sum of the concentration coefficients G_k^* ,

$$(4) \quad G = \sum_{k=1}^K \frac{\mu_k}{\mu} G_k^* = \sum_{k=1}^K S_k G_k^* ,$$

where $S_k = \mu_k/\mu$ is the share of component k in total income. The percentage contribution of income source k to total income equality is found to be

$$(5) \quad P_k = S_k \frac{G_k^*}{G} \times 100\% .$$

The marginal contribution of each income source k to inequality can be described by an elasticity of the Gini coefficient, which is given by LERMAN and YITZHAKI (1994) as

$$(6) \quad \epsilon_{G,S_k} = \frac{S_k (G_k^* - G)}{G} .$$

4 EFFECTS OF NON-FARM INCOME ON HOUSEHOLD WELFARE AND INCOME INEQUALITY

There are three (complementary) pathways out of rural poverty: (1) farming (intensification, specialisation), (2) non-farm labour, and (3) migration (WORLD BANK 2007). Furthermore, the level of social transfers clearly influences the vulnerability of rural households towards poverty risk. Our analysis of farm household data focuses on the role of non-farm income and its contribution to household welfare and inter-household income distribution in rural Croatia. Section 4.1 gives an overview of the income structure of Croatian family farms. Further

⁵ The Gini coefficient is the most widely used measure of income distribution. Its value varies between zero and one, with zero indicating a perfectly equal income distribution. The higher a Gini coefficient is, the more unequally the incomes are distributed. Gini coefficients between 0.25 and 0.35 are considered 'reasonable', while coefficients higher than 0.5 indicate that income distribution is seriously unbalanced (ELLIS 2000).

poverty and income distribution measures are presented in Section 4.2. Finally, Section 4.3 offers some insights regarding the probable future of the researched family farms.

4.1 Income structure of Croatian family farms

In 2006, the annual per capita income in Croatia reached €7,230 (WORLD BANK 2008). Unsurprisingly, the rural incomes are considerably lower than this national average (see Table 1). The income portfolio of the small family farms contains three main categories, the biggest of which is with about 47% farming income. The regions, which were chosen as being characterised as rural (Bjelovar-Bilogora) and peri-urban (Zagreb county) show clear differences with regard to farm incomes. Farming income contributes slightly less than 40% to the household incomes in Zagreb County; in Bjelovar-Bilogora the share is 56%. Non-farm income – depending on the region – makes up a share of between 26% and 37%. The remaining incomes refer to so called unearned incomes, which consist of social transfers, interest gains, pensions, etc. The main component within this category is old age pensions (about 60%). This category of income has a slightly lower share in the poorer Bjelovar-Bilogora region.

Table 1 Regional income of farm households in Croatia (2006, in € and %)

	Total	Zagreb	Bjelovar-Bilogora
Per capita income (€)	3,804	4,099	3,477
Per capita income, equivalent scale (€)	7,201	7,705	6,642
Household income (€)	15,328	16,230	14,316
- Farm income (%)	46.75	38.45	56.05
- Non-farm income (%)	31.72	37.16	25.61
- Unearned income (%)	21.52	24.37	18.33

Source: Own calculation. N=173 farm households Notes: The WORLD BANK (2008) estimates annual per capita income for 2006 as €7,230. The average household size in the sample is 4.1 persons.

Table 2 depicts income along farm types. Farm types reflect the income generating activities in a household and are defined according to two criteria: (1) the labour input into farming and (2) the proportion of income received from farming as compared to the one from non-farm employment. Following HENRICHSMeyer and WITZKE (1991) we distinguish three types of farms: In the first two the major share of the household head's labour is allocated to farming and most of the household's earned incomes are derived from the farm. Full-time farms earn a maximum of 10% from non-farm sources, whereas the second type of farms complements its farm incomes by a share of non-farm incomes of between more than 10% and less than 50% (part-time farms, complemented). The third type is the typical subsidiary farm where the household head spends most of the working time outside the farm sector or the non-farm

incomes are bigger than the farm incomes (part-time farms, subsidiary).⁶ Full-time farms (type 1) are best-off with regard to per capita incomes. Compared to those whose main income sources lie outside the agricultural sector (type 3), their income is more than 60% higher. This difference could be explained by the higher share of farming incomes (68% versus 33%), but more so by the three times higher ratio of farm incomes per hectare of land.

Table 2 Incomes according to farm type classes in Croatian regions, 2006

Farm type	Per capita income, equivalent scale (€)	Farm income per ha of land (€/ha)	Farm share in total incomes (%)
1 Full-time farms	9,386	3,318	68.1
2 Complemented part-time farming	8,720	2,671	64.1
3 Subsidiary part-time farming	5,797	975	33.0
Kruskal-Wallis Test	6.631	37.599	67.777
χ^2	0.036	0.000	0.000
p			

Source: Own calculation.

Note: The share of farm income in total income differs from the limits used for the definition of farm type classes as described above because the definition of farm types refers to “earned incomes”, whereas the total income also includes “unearned incomes”.

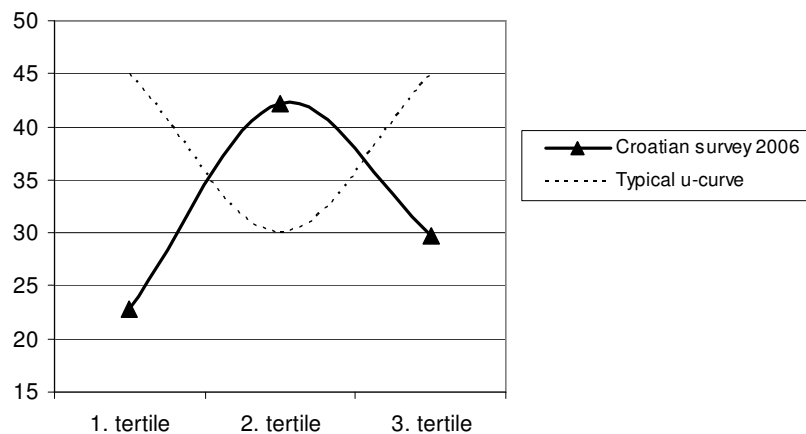
Table 3, comparing income groups (tertiles), strengthens the notion that farming incomes could make the differences in terms of economic well-being. Again, the wealthiest group is characterised by the highest farming incomes per hectare. There is also a clear increasing trend showing that the better-off have more access to land. The share of farm income is highest in the richest tertile (52%), but also the poorest are highly dependent on farming (50%). MCKINNON *et al.* (1991) state that the most vulnerable households are often characterized by low access to land, and, at the same time, a high dependency on agricultural incomes. This relationship is depicted in Table 4. Indeed, bigger farms are better off; the dependency on farm incomes, however, is clearly lower for smaller farms. Yet, even those who work on only three hectares or less are relying to more than one third on this type of income.

Figure 1 depicts the empirically-discovered relationship between income level and share of non-farm income sources in the households' income portfolio. Contrary to the expected decreasing or u-shaped curves discussed in Section 2, the higher level of non-farm incomes in the middle-income class leads to an inversely shaped u-curve. Particularly the poorest group relies with 22% to a relatively low degree on non-farm income. Typically, poorer households have a high incentive but a low capacity to diversify into non-farm activities successfully. This issue was already discussed by LANJOUW (2007). They often remain relegated to badly paying, low productivity, risky jobs (REARDON *et al.* 2007). For the middle income class of

⁶ This socio-economic classification is different from the EU typology that is used for instance by EUROSTAT. According to the EU, the type of farming of a holding is determined by its economic size unit (ESU) (*Official Journal L 220*, 17/08/1985). Full time farms must reach a sufficient size that allows them to fully employ the farmer and support his family.

our Croatian sample, non-farm income sources are most important and it seems that here alternative employment is able to significantly increase incomes. Thus, the reason for the inverse u-shaped relationship is most probably a distress-push situation. In this situation, access to non-farm employment is easier or more difficult for certain parts of the population. At the same time farming is still the most lucrative option for rural households compared to all other income sources.⁷ The middle income households seem to be characterised by their ability to find alternative employment in the non-farm sector which allows compensating low farming incomes.

Figure 1 Income groups and share of non-farm incomes



Source: Own calculation.

The poorest households have, compared to the other two income groups, a higher share in unearned incomes (Table 3). This could point to the fact that old age poverty is widespread in rural Croatia. Also their higher dependency ratio indicates a larger share of dependent persons in poorer households. Indeed, the average number of elderly persons is 1.5 in these households as compared to 1.3 in the other two groups.⁸ Although household heads with higher education are only found in the richest income group, education does not seem to be the decisive factor in differentiating poorer from wealthier family farms. However, group differences are not statistically significant (see Table 3). Results on the national level (WORLD BANK 2006) show a strong negative correlation between poverty risk and the level of education of the head of household. This pattern does not vary much between urban and rural areas. Secondary education stands out as the key threshold: households whose heads have only primary or even a lower education have a poverty risk twice the average, but secondary education reduces the risk of poverty to one-third of the average. More than three-quarters of the poor live in households headed by individuals with primary or even lower school attainment.

⁷ Although this result does not reflect common theory, it is neither incomprehensible nor exceptional: For example, Möllers (2006) finds an inversely shaped u-curve for rural households in Macedonia.

⁸ The nation wide poverty study of the World Bank (2007) finds that generally the risk of poverty increases with age. The incidence of poverty is highest among households headed by the elderly, who face a poverty risk twice the average. Even though only one-fourth of the population belongs to households headed by an elderly person (65 years or older), this group accounts for almost half of the poor.

Surprisingly, the location of the households in either Zagreb county or Bjelovar-Bilogora does not seem to play a role for the wealth of a household. The share of each income group in the sum of all incomes reveals a first result in terms of income distribution. With only about 10% the poorest tertile earns an extraordinary low share of all incomes. The best off group on the contrary has access to two thirds of all incomes.

Table 3 Socio-economic characteristics according to income classes, 2006

	Income class (tertile)			All households	Test statistics X^2 / p
	1	2	3		
Croatian regions					
Households from Bjelovar-Bilogora (%)	41.38	52.63	48.28	47.40	1.478 / 0.478
Household income (€)	8,641	11,854	25,668	15,328	46.394 / 0.000
Per capita income, equivalent scale (€)	2,278	5,438	13,857	7,201	50.804 / 0.000
Median of per capita income (€), equivalent scale	2,539	5,332	9,630	5,636	
Share in all household incomes (%)	10.22	23.50	66.27	100.00	
Income shares (%)					
- Farm income	49.76	38.79	52.31	46.75	4.431 / 0.109
- Non-farm income	22.77	42.23	29.68	31.72	10.306 / 0.006
- Unearned income	27.46	18.97	18.00	21.52	1.486 / 0.476
Farm land (ha)	4.71	5.79	9.55	6.66	5.248 / 0.073
Farm income per ha of land (€/ha)	978.23	1354.04	3412.77	1904.14	8.442 / 0.015
Dependency ratio	0.68	0.57	0.40	0.55	2.966 / 0.227
Education level of household head (%):					
- Elementary or lower	43.10	40.35	43.10	42.53	0.906 / 0.953
- Vocational school	8.62	22.81	12.07	14.37	3.049 / 0.218
- Secondary school	48.28	36.84	41.38	41.95	2.067 / 0.356
- Higher education	0.00	0.00	3.45	1.15	3.989 / 0.136

Source: Own calculation

Note: N=173 farm households; Tertile 1 = Income class with the lowest per capita income etc. The test statistics refer to a Kruskal-Wallis-Test.

Table 4 Income according to farm size classes in Croatian regions

Farm size		Yearly income	
Class (N)	Size	Per capita income (€), equivalent scale	Farm incomes of household (€) (share in total in brackets)
1 (57)	0-3 ha	4,647	2,950 (34.6%)
2 (86)	> 3-10 ha	7,994	10,248 (46.9%)
3 (20)	> 10-20 ha	9,490	16,568 (68.9%)
4 (10)	> 20-50 ha	10,359	21,090 (75.3%)
Kruskal-Wallis Test χ^2		17.339	41.317 (23.199)
p		0.001	0.000 (0.000)

Source: Own calculation

4.2 Poverty measures and income distribution

The risk of becoming absolutely poor is generally low in Croatia. The headcount index calculated on the basis of a USD 4.30 poverty line accounts for only 0.04. In other words, 4% of the farm households in our sample face absolute poverty⁹ (Table 5). On a relative basis, following the EU approach¹⁰, we calculated with a poverty line reflecting 60% of the median income and find that slightly more than one quarter of the sample households are falling below this poverty line.

Table 5 Poverty measures in the Croatian survey regions (2006)

	Yearly income (€)	Headcount- index	Poverty deficit	Poverty severity
Absolute poverty line				
4.30 USD-line	844	0.04	0.08	0.32
<hr/>				
Absolute poverty line 2004*	3,086	0.23	0.11	0.10
<hr/>				
Relative poverty line				
60% of median	3,382	0.26	0.12	0.10

Source: Own calculation.

*Absolute poverty line estimated by the WORLD BANK (2006) on the base of a “cost of basic needs” approach for 2004 national incomes.

The poverty deficit, defined as the average distance of the poor to the poverty line, is rather low with 12% of the relative poverty line, but considerably higher compared to the national figure of 2.4% as given by the WORLD BANK for the year 2004 (WORLD BANK 2006). In our sample, a household can be lifted above the relative poverty line with an additional 405€ per year on average. The measure of poverty severity considers income differences by giving more weight to the poorest. That is, a higher weight is placed on those households who are

⁹ This result can be compared to World Bank results of 2004, where also 4% of a nation-wide sample fell below this USD-4.30 poverty line (World Bank 2007 LSA).

¹⁰ According to the called Laeken indicators (18 indicators of poverty and social exclusion adopted at the 2001 EU Council in Laeken, Belgium), the poverty cut-off point is at 60% of the median equivalised income after social transfers (<http://www.poverty.org.uk/summary/eu.htm>). See also Matkovic (2007).

further away from the poverty line. This indicator shows relatively high figures for the sample households meaning that the income distribution amongst the poor is considerably unequal.

The upper part of Table 6 shows the distribution of all household incomes in the sample, as well as an income distribution that was calculated excluding farm incomes. The sample household data is notably more unequally distributed, as indicated by a Gini coefficient of 0.45, compared to 0.28, the national coefficient for the year 2006 (CROSTAT Statistical Yearbook 2008). Unequally distributed farming incomes or, respectively, a lack of access to non-farm incomes that could have an equalising effect (see Table 3) are probably among the reasons why our rural sample shows this comparably high coefficient.

To answer the question of whether non-farm incomes are able to reduce income inequality, we look at the Gini coefficient, which was calculated without considering non-farm incomes. We find a notable increase of the Gini coefficient, namely 0.51. This implies that non-farm income contributes to a more equal income distribution in rural areas. The examination of partial coefficients calculated on the basis of decomposed Gini coefficients confirms this result (lower part of Table 6). While non-farm incomes influence the income distribution positively, farm incomes seem to have the most negative impact on income equality.¹¹

The calculation of elasticities facilitates interpreting the data with regard to marginal contributions of different income sources to the income distribution (see Section 2). The elasticity for farm income is positive (0.20) and negative for non-farm incomes (-0.10). A negative elasticity indicates a positive impact on the income distribution, i.e., the Gini coefficient will decrease when the respective income increases. In the sample, a 1% increase of non-farm incomes would lead to a decrease in income inequality of 10%.

Table 6 Income distribution and non-farm incomes in the Croatian survey regions

Gini coefficient	
▪ on the basis of adjusted per-capita incomes	0.45
▪ non-farm incomes excluded	0.51
Decomposed Gini coefficients	
▪ on the basis of farm incomes	0.60
▪ on the basis of non-farm incomes	0.29
▪ on the basis of unearned incomes	0.12

Source: Own calculation.

Note: For the calculation of Gini coefficients, all households in the sample were considered, including those who have no share in the respective income source; thus, the decomposed Gini coefficients are so-called pseudo Gini coefficients (ESCOBAL 2001).

4.3 Is farm exit an option?

The future of small-scaled farms in Croatia depends on their ability to become competitive in a European Single Market (see for example FROHBERG *et al.* 2008). Thus policy makers need to have an eye on structural change developments. As shown above, there is an already high level of non-farm diversification to be found in rural Croatia. The question is if diversified income sources rather trigger farm exit or inhibit structural change because they allow a large number of tiny farms to persist?

¹¹ Caution is advised in the interpretation of the coefficients however, as the category of farm income includes a considerable number of households with negative incomes.

Table 7 shows sample statements made with regard to the plans of farm households to continue or not the farming business within a time frame of five years. Although it is rather evident that considerable adjustment in most agricultural enterprises is required, the largest share of farms (29.7%) state that no changes are planned. About 17% have the intention to (further) diversify their incomes by taking up non-farm employment. Just 13.7% of the families plan to expand their farm and only 10.9% state that they will abandon the farm. A surprisingly high percentage of farms intend to continue farming for subsistence or hobby purposes. In Zagreb county this group makes up almost 20% (13.4% in Bjelovar-Bilogora). Also the share of intended farm exits is higher in Zagreb county. Thus, it looks as if in a situation in which the non-farm sector offers sufficient employment opportunities, abandoning or hobby farming become an option. Farm exit seems to be favoured by farms of type 2. These farms have their foot in the door as it refers to the rural non-farm sector, but are probably not subsistence or hobby oriented at this stage.¹² At the same time a considerable share of type 2 farms intend to expand their farming activities. Farms of type 3 that are already now less involved and also less successful in agriculture are further heading towards the non-farm sector; in many cases the farm will be maintained for hobby purposes. Full-time farms (type 1) are, not surprisingly, interested in farm expansion. However, also in this group about 20% plan to either abandon the farm or use it for subsistence or hobby purposes; 13.5% intend to take up non-farm employment to complement their incomes. One third of the full-time farms plan no major changes, which might be seen as an indication that there is a lack of awareness about the impacts to be expected from becoming part of the European Single Market and the ongoing structural change in general.

Table 7 **Anticipated future of farms (%)**

	"Where do you see your farm in five years from now?"					
	Farm abandoned	Farming plus (additional) non-farm employment	Subsistence/hobby farming	No major change	Farm expansion	Don't know
All households	10.9	17.1	16.0	29.7	13.7	12.6
Zagreb	9.1	18.2	19.3	29.5	10.2	13.6
Bjelovar-Bilogora	7.3	17.1	13.4	31.7	18.3	12.2
Farm type 1	7.7	13.5	13.5	32.7	21.2	11.5
Farm type 2	15.8	10.5	5.3	21.1	26.3	21.1
Farm type 3	11.5	20.2	19.2	29.8	7.7	11.5

Source: Own calculation.

Note: N=175 farm households

Beside the future of the farm, also individual household employment choices including individual farm exit decisions are interesting to investigate. Table 5 gives an overview of the intended movements with regard to the employment status of all farm household members in active age. Overall, there is a clear trend from farming activities towards non-farm employment. While pluriactive individuals (i.e. those who are involved in farming and non-farm activities at the same time) rather tend to stay with this status, full-time farmers are keen

¹² A similar observation, although referring to farm sizes, was made by Hye-Jung (2006) who finds that the probability of farm exit forms an inverted U, i.e. it is higher for medium-sized farms.

to leave the sector. 57% of current full-time farmers intend to give up their farming work in favour of non-farm employment. Interestingly, there is also a backward trend visible from non-farm employment to farming. It seems that non-farm employment is particularly attractive to those who are working only on the farm while, on the contrary those who are not involved in the farming business rather show interest to return. However, the number of cases of those who are solely employed in the non-farm sector is too small to allow any final conclusions about the nature of this backward movement.

Table 4 Anticipated employment choice of individual household members (%)

Current employment status		Anticipated employment status			Total
		1	2	3	
1	% of current status	22.6	20.3	57.1	100.0
	% of anticipated status	48.5	34.9	91.9	27.9
2	% of current status	29.7	61.7	8.6	100.0
	% of anticipated status	37.6	62.7	8.1	34.8
3	% of current status	82.4	17.6	0.0	100.0
	% of anticipated status	13.9	2.4	0.0	37.3
Total	% of current status	59.9	35.4	4.7	
	% of anticipated status	100.0	100.0	100.0	

Source: Own calculation.

Note: N=362 persons in active age;

1: full-time farmer, 2: pluriactive, 3: non-farm employment

Bold percentages indicate the share of persons who plan to stay with their current status.

5 CONCLUSION

Although poverty levels in Croatia are generally rather low, Croatian family farms are facing a considerable poverty risk. Depending on the poverty lines applied the headcount index for poverty rises up to 26%. The WORLD BANK (2007) recently stated that farm intensification, non-farm employment and migration are prominent ways out of poverty. The effect of farm and non-farm income on income and inter-household income disparity among Croatian farm households is at the centre of analysis here.

The analysed income portfolios are highly diversified. Farming income has with about 47% the biggest share. But also non-farm income sources are an integral part (almost one third) of the household income. The relative share is, not surprisingly, higher in the peri-urban research region of Zagreb county compared to the typical rural Bjelovar-Bilogora. We find that non-farm income is most prominent among the middle income class. This result is not in line with findings from developing countries, where rather the poorer and richer households enter the rural non-farm economy. Yet, it seems sensible as it depicts a situation in which, on the one hand the poor face constraints in entering alternative employment, especially better-paid employment, and thus stay back in terms of their income level. On the other hand, those who have the capacity to rely mostly on farming do so because farm work is most lucrative under the given circumstances. However, there are huge differences in terms of farm income per hectare. Full-time farms earn more than a three times higher income per hectare of land as compared to those whose farm activities are subsidiary.

Non-farm income not only contributes significantly to the welfare of the researched family farms, it also plays an important role in keeping the inter-household income distribution in

balance. Based on the analysis of decomposed Gini coefficients we find that non-farm incomes have a positive effect on the income distribution, while farm incomes work in the opposite direction.

Although Croatia's family farms require considerable structural adjustments to be able to compete in the European Single Market, this need is not fully reflected in the stated planned farm development. Many – including a large share of full-time farmers, are planning no changes at all. Especially in Zagreb county, where the rural non-farm sector offers more opportunities both, farm exit and hobby farming become an option. Farm exit, intended by about 11% of all farms, is more probable for those who currently rely mainly on farm incomes, but have already a relatively large share of non-farm incomes. Those who are already now less involved and less successful in agriculture are further heading towards the non-farm sector; in many cases the farm will be maintained for hobby purposes. Only 13.7% of the farmers intend to expand farming activities. Those who are already now mainly or full-time employed on the farm are most interested in farm expansion. The analysis of employment decisions of individual farm family members shows a clear trend away from farming activities towards non-farm employment. While pluriactive individuals (i.e. those who are involved in farming and non-farm activities at the same time) rather tend to stay with this status, full-time farmers are keen to leave the sector.

The biggest challenge for rural development policy in Croatia is the necessary convergence with the EU. Macro developments clearly show that the employment rate and labour productivity will need to rise substantially to reach this goal (WORLD BANK 2006). Thus, despite the already highly diversified income portfolios and the willingness and interest to enter RNFE, job creation is surely the Achilles' heel of rural Croatia. From our analysis, we can conclude that a favourable environment for the diversification of the rural economy would probably not only increase rural welfare, but also help to smoothen the income distribution among farm households. It could furthermore encourage farm exits and by this help those who adapt their farms to European standards. With regard to structural change in agriculture, the observed tendency to maintain small farms for hobby and subsistence purposes should be watched carefully.

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REFERENCES

- ALAM, A., M. MURTHI AND R. YEMTSOV (2005). Growth, Poverty and Inequality. Eastern Europe and the Former Soviet Union. World Bank, Washington, DC.
- BARRETT, C., T. REARDON and P. WEBB (2001). Nonfarm income diversification and household livelihood strategies in rural Africa: concepts, dynamics and policy implications. *Food Policy* 26 (4): 315-331.

- COUDOUËL, A., J. S. HENTSCHEL and Q. T. WODON (2000). Poverty Measurement and Analysis, in: Poverty Reduction Strategy Sourcebook. World Bank, Washington, DC.
- CROSTAT (2008). Statistical Yearbook 2008. Central Bureau of Statistics of the Republic of Croatia, Zagreb, <http://www.dzs.hr>, accessed 2009.
- DE JANVRY, A. and E. SADOULET (2001). Income Strategies Among Rural Households in Mexico: The Role of Off-farm Activities. *World Development* Vol 29; no.3, pp.467-480.
- DEININGER, K. and P. OLINTO (2001). Rural Non-farm Employment and Income Diversification in Colombia. *World Development* Vol 29; no.3, pp.455-465.
- EFSTRATOGLOU-TODOULOU, S. (1990). Pluriactivity in different socio-economic contexts: a test of the push-pull hypothesis in Greek farming. *Journal of Rural Studies* 6 (4): 407-413.
- ELLIS, F. (2000). Rural Livelihoods and Diversity in Developing Countries. Oxford University Press, Oxford.
- ESCOBAL, J. (2001). The Determinants of Nonfarm Income Diversification in Rural Peru. *World Development* 29 (3): 497-508.
- EUROSTAT (2009). Database of the European Statistics Office. <http://epp.eurostat.ec.europa.eu> , accessed 2009
- FOSTER, J., J. GREER and E. THORBECKE (1984). A Class of Decomposable Poverty Measures. *Econometrica* 52 (3): 761-65.
- FROHBERG, K., J. MÖLLERS, P. ZIER AND S. BOJNEC (2008): Competitiveness of Croatia's Dairy Sector in View of the pending EU accession. Contributed paper presented at the XIIth Congress of the European Association of Agricultural Economists, August 26-29, 2008, Ghent, Belgium.
- HENRICHSMEYER, W. AND H. P. WITZKE (1991). Agrarpolitik Band 1. Agrarökonomische Grundlagen. Eugen Ulmer, Stuttgart.
- HYE-JUNG, K. (2006). Determinants of farm exit in Korea. *Journal of Rural Development* 29(4): 33-51.
- LANJOUW, P. (2007). Does the rural nonfarm economy contribute to poverty reduction? In Transforming the rural nonfarm economy. Opportunities and threats in the developing world, Haggblade, S., Hazell, P.B.R., and T. Reardon (eds.): 55-79. Baltimore, ML, USA: Johns Hopkins University Press.
- LANJOUW, P. and G. FEDER (2001). Rural Non-farm Activities and Rural Development: From Experience Towards Strategy. Rural Development Strategy Background Paper 4. World Bank, Washington, DC.
- LERMAN, R. I. and S. YITZHAKI (1994). Effect of Marginal Changes in Income Sources on US Income Inequality. *Public Finance Quarterly* 22 (4): 403-17.
- MATKOVIĆ, T, ŠUĆUR, Z AND S. ZRINŠČAK (2007). Inequality, Poverty, and Material Deprivation in New and Old Members of European Union, *Croatian Medical Journal* 2007; 48: 636-52.
- MCKINNON N., J. BRYDEN, C. BELL, A.M. FULLER and M. SPEARMAN (1991). Pluriactivity, Structural Change and Farm Household Vulnerability in Western Europe. *Sociologia Ruralis* 31 (1): 58-71.
- MÖLLERS, J. (2006). Außerlandwirtschaftliche Diversifikation im Transformationsprozess – Diversifikationsentscheidungen und -strategien ländlicher Haushalte in Slowenien und

Mazedonien, *Studies on the Agricultural and Food Sector in Central and Eastern Europe*, Vol. 35, Halle (Saale).

MÖLLERS, J. and G. BUCHENRIEDER (2005). Theoretical concepts for the analysis of non-farm rural employment. *Quarterly Journal of International Agriculture* 44 (1): 19-36.

MÖLLERS, J., ZIER, P., FROHBERG, K., BUCHENRIEDER, G., AND Š. BOJNEC (2009 forthcoming). Croatia's EU accession socioeconomic assessment of farm households and policy recommendations. *Studies on the Agricultural and Food Sector in Central and Eastern Europe*, Vol. 47. Halle (Saale), D: Leibniz Institute of Agricultural Development in Central and Eastern Europe (IAMO).

NESTIĆ, D. AND G. VECCHI (2007). Regional Poverty in Croatia. in Lovrinecic *et al...* (Ed.), Social Policy and Regional Development Conference Proceedings, Zagreb: EIZ and FES, p.p. 65-90.

OECD (2006). The new rural paradigm: Policies and governance. Paris, F: Organization for Economic Cooperation and Development (OECD).

REARDON, T., BERDEGUÉ, J., BARRETT, C.B., AND K. STAMOULIS (2007). Does Household Income Diversification into Rural Nonfarm Activities. In Transforming the rural nonfarm economy. Opportunities and threats in the developing world, Haggblade, S., Hazell, P.B.R., and T. Reardon (eds.): 55-79. Baltimore, ML, USA: Johns Hopkins University Press.

REARDON, T., J.E. TAYLOR, K. STAMOULIS, P. LANJOUW and A. BALISACAN (2000). Effects of Nonfarm Employment on Rural Income Inequality in Developing Countries: An Investment Perspective. *Journal of Agricultural Economics* 51 (2): 266-88.

REARDON, T., K. STAMOULIS, M.-E. CRUZ, A. BALISACAN, J. BERDEGUE and B. BANKS (1998). Rural Non-Farm Income in Developing Countries, in: The state of food and agriculture, Part III. Food and Agricultural Organisation of the United Nations (FAO), Rome.

SHORROCKS, A. (1980). The Class of Additively Decomposable Inequality Measures. *Econometrica* 48 (3): 613-25.

START, D. (2001). The Rise and Fall of the Rural Non-farm Economy: Poverty Impacts and Policy Options. *Development Policy Review* 19 (4): 491-505.

WORLD BANK (2000). Making Transition Work for Everyone: Poverty and Inequality in Europe and Central Asia. World Bank, Washington, D.C.

WORLD BANK (2006). Croatia: Living Standards Assessment. Report No. 37992. Poverty Reduction and Economic Management Unit Europe and Central Asia Region, World Bank, Washington, D.C.

WORLD BANK (2007). World Development Report 2008: Agriculture for Development. World Bank, Washington D.C.

WORLD BANK (2009). Database of the World Bank. <http://www.worldbank.org/>, accessed 2009.