Effects of Rural Non-farm Employment on Household Welfare and Income Distribution of Small Farms in Croatia

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Abstract

Rural non-farm employment (RNFE) is thought to ease poverty, economic vulnerability and income inequality. Two key questions arise: (1) Do alternative income sources actually help to raise the welfare of small family farms? (2) How is the rural regional income distribution affected by mixed income structures? Based on empirical farm household data from Croatia, this paper analyses the effect of RNFE on income structure and inter-household income distribution among small family farms in transition. We find that agricultural income seems to function as a switch in terms of rural welfare: the smallest and poorest farms – although heavily dependent on farm income – need RNFE to sustain their lives. The better-off farms are only slightly bigger, but achieve significantly higher farm incomes per hectare. RNFE affects rural livelihoods positively in three ways: it is the most important income source of middle-income farms, it lifts poor households out of poverty, and is found to be an important catalyst that helps smooth income inequality in rural regions.

1 Introduction

Poverty in rural regions of transition economies is widespread. The ongoing transition process in eastern and south-eastern Europe offers new economic opportunities and employment options to the rural population. However, the majority of people remember the reform process as a shock which has brought inflation, unemployment, and a loss of lifetime savings. Unequivocally, transition produced an initial increase in poverty levels as well as greater 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 EU-27 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. The latest available EUROSTAT data for Croatia indicates a poverty rate of 18% in 2003 (EUROSTAT, 2009). In absolute terms Croatia is well off compared to other south-eastern European countries (e.g. Albania, Romania or Bulgaria). 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 in Croatia 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 – most farmers 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 whether rural non-farm employment (RNFE) could provide a better life? Despite continuing efforts to fight rural poverty, it has persisted to the present day. In contrast to the past, current rural development approaches have therefore adopted a more comprehensive view, acknowledging the diverse endowments of rural regions and particularly the multiplicity of income sources of rural households (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 income sources to diversify risks (DE JANVRY and SADOULET, 2001; Buchenrieder et al., 2010). 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. 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. It does not, however, consider farm households as a separate category. This paper fills this gap by providing insights that specifically refer to the situation of small family farms. It draws on a 2007 survey of 175 randomly selected farm households[1] in two Croatian regions.

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[1]   The terms *household* and *family* are used interchangeably.

The research questions arising in the Croatian contexts are: (1) How important is non-farm income for small family farms? (2) How does non-farm income affect welfare and inter-household income inequality? Alongside an array of better known poverty measures, decomposed Gini-coefficients are used to analyse the effect of non-farm employment on income distribution. The calculation of Gini elasticities enables description of the marginal contribution of different income sources to inequality. We further show how non-farm income helps to lift farm households above the poverty line.

2   RNFE in the Context of Poverty Alleviation and Income Distribution

Despite considerable economic growth (on average 3.7% growth of GDP over ten years), Croatia has seen a slow job creation process and its employment rate[2] (56% in 2006) is one of the lowest in Europe. Particularly the long-term unemployment rate is high: 6.7% in 2006 compared to 3.7% in the EU-27 in the same year (EUROSTAT, 2009). The overall poverty risk in Croatia is comparatively low. However, headcount poverty rates vary across regions from less than 3% to more than 20%.[3] A wide gap in the headcount ratios exists between urban and rural areas (around 6% in urban areas compared to more than 15% in rural areas). In rural areas, poverty risk increases for the 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 between 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: 496). Those who are already better off normally dominate lucrative business niches and often earn higher shares and levels of non-farm income (DAVIS et al., 2009). This would imply that the poorer rural households are not the main beneficiaries of non-farm income. It is indisputable, however, that non-farm employment is important for their wellbeing too (WORLD BANK, 2007).

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[2]   The Lisbon Strategy aims at making the EU one of the most competitive and dynamic knowledge-based economic regions of the world within ten years, in other words by 2010. This includes increasing the employment ratev to 70% in 2010. In 2009 it was at 64.6% (EUROSTAT, 2010).

[3]   These numbers refer to the World Bank study, which uses the 2004 Household Budget Survey and a poverty line of 22,145 *kunas* per equivalent adult per year. This poverty line is derived using a cost of basic needs methodology (WORLD BANK, 2006).

Reflecting the diverse nature of RNFE, two different directions of non-farm diversification have been identified: demand-pull and distress-push processes (EFSTRATOGLOU-TODOULOU, 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 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 theoretical welfare model demonstrating that, in theory, both directions have the potential to reduce poverty. Benefits arise not only for demand-pull shifters whose incentive to engage in RNFE is higher wages, but also for distress-push shifters: poor farm families are typically characterised by low or zero opportunity costs with regard to farm work (due to disguised unemployment). As long as total 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 the wage rate of non-farm work is lower than the average farm wage rate. Thus, RNFE is expected to reduce rural poverty or, in other words, raise rural welfare. Nonetheless, it seems that many stories about growth in the non-farm sector driving down rural poverty do not withstand close scrutiny: LANJOUW (2007) warns that the relationship between poverty and non-farm employment may be more subtle than an initial impression may suggest and drawing simple conclusions with regard to causality should be avoided.

The effect of farm and non-farm employment on income inequality is even 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) summarise different hypotheses. 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. LANJOUW and LANJOUW (1997) argue that empirical studies instead tend to find u-shaped relationships between non-farm incomes and total incomes, meaning that it is

particularly the poorest and the richest households that 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 background conditions are less favourable, they expect a decreasing linear relationship. KIMHI (2009) reviewed several empirical studies and finds mixed evidence in terms of the effect of non-farm income on income inequality. His analysis of Georgia, Korea and Ethiopia, however, comes to a uniform result, namely that non-farm income is an equalising source of income. MÖLLERS (2006) finds the same results for Slovenia and Macedonia.

3   Data and Analytical Methods

This paper is based on a unique farm household survey conducted in spring 2007. The main objective of this empirical work was to fill existing knowledge gaps concerning socio-economic characteristics of Croatian farms in view of the negotiations on the Agricultural Chapter[4] with the EU. The results draw on 175 households from two Croatian regions and are therefore not nationally representative; they do, however, offer highly detailed insights that are otherwise not available into Croatia's family farms. The applied structured questionnaire contained several customised modules capturing, among other things, farming activities, all sources of income, and driving forces of income diversification. All income data refer to the year 2006.[5] The selection of the survey regions was based upon the possibility of different employment opportunities: (1) Zagreb County represents a region with a more peri-urban character and favourable opportunities with regard to markets and particularly non-farm employment; (2) Bjelovar-Bilogora County is a typical rural, comparatively poor region. The regions' boundaries are based on the administrative unit of counties, which roughly correspond to the NUTS-3 level as used in the EU.

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 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 small in Zagreb County; more than 40% of family farms cultivate up to one hectare and are hardly market-oriented, whereas only 4.4% utilise more than ten hectares, accounting for about one quarter of the farm land available in this county.

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[4]   More information on the current state of the negotiations can be found under
     http://www.eu-pregovori.hr.

[5]   Further information on this study, entitled 'Croatia's EU Accession: Socio-economic Assessment
     of Farm Households and Policy Recommendations', is provided in MÖLLERS et al. (2009).

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 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-scale family farms prevail; the average farm size is only 3.4 hectares and only 10% of the farms have access to ten or more hectares. Major industries in Bjelovar-Bilogora County include food processing and some construction business and metallurgy industries. It is a county with one of the highest poverty rates and the highest proportions of agricultural employment in Croatia (WORLD BANK, 2006).

3.2 Methods

Our analysis focuses on the effect of RNFE on poverty and inter-household income inequality. Poverty is measured by three 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

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

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 individuals 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, 2000; COUDOUEL et al., 2002).

Poverty analyses usually refer to equivalised household sizes, i.e. per capita incomes are calculated taking into account 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. Here we use a class of equivalence scales which can be described by the following formula:

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

where θ is a parameter between 0 and 1 to be chosen or estimated. We set the equivalence scale θ to 0.53. The resulting equivalence figures for typical household sizes are very close to the so-called OECD-II equivalence scale, which is widely used by Eurostat in calculating comparable income, poverty and social exclusion indicators for EU countries ("Laeken" indicators).[6]

The effect of certain income sources on income distribution can be determined by Gini coefficients[7] in two ways. 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 income). 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 enables conclusions to be drawn 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 total income that income source represents (SHORROCKS, 1980; WORLD BANK, 2000). The concentration coefficient G_k^* for income component k, is given by

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

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^*,

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

where $S_k = \mu_k/\mu$ is the share of component k in total income. The 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

$$(5) \qquad \in_{G,S_k} = \frac{S_k \left(G_k^* - G \right)}{G} \ .$$

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[6] The OECD II equivalence scale 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 (http://www.oecd.org/LongAbstract/0,2546,en_2825_497118_35411112_1_1_1_1,00.html).

[7] The Gini coefficient is the best known and most widely used measure to describe income distribution. Its value varies between zero and one, with zero indicating a perfectly equal income distribution. The higher the Gini coefficient, the greater the inequality in income distribution. 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).

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 to poverty. Our analysis focuses on the second pathway, rural non-farm income, and scrutinises its contribution to household welfare and inter-household income distribution. Section 4.1 gives an overview of the income structure of Croatian family farms. Further, poverty and income distribution measures are presented in Section 4.2. Finally, Section 4.3 offers some insights regarding the probable future of the family farms that were the focus of the research.

4.1 Income Structure of Croatian Family Farms

In 2006, current annual per capita income in Croatia reached €8,807 (HNB, 2009). Unsurprisingly, rural incomes are considerably lower than this national average (see table 1). The income portfolio of small family farms contains three main categories, the largest of which, at 47%, is farming income. Rural (Bjelovar-Bilogora) and peri-urban (Zagreb county) regions reveal clear differences with regard to farm incomes. Farming income contributes slightly less than 40% to 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%. Remaining income refers to so-called unearned income, and consists for instance of social transfers, interest earned, and pensions. 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

	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 (%)	46.8	38.4	56.1
- Non-farm income (%)	31.7	37.2	25.6
- Unearned income (%)	21.5	24.4	18.3

Notes: The average household size in the sample is 4.1 persons.
Source: own calculation, N=173 farm households

Table 2 depicts income according to farm types. Farm types reflect the income-generating activities in a household and are defined according to two criteria: (1) labour input into farming and (2) the proportion of income received from farming compared to that from non-farm employment. Following HENRICHSMEYER and WITZKE (1991) we distinguish three types of farms: in the first two types of farms, the major share of household head labour is allocated to farming and most of the household's earned income derives from the farm. Full-time farms earn a maximum of 10% from non-farm sources, whereas the second type of farm complements its farm income with non-farm income amounting to somewhere between 10% and below 50% of total income (part-time farms, complemented). The third type is the typical subsidiary farm, in which the household head spends most of his/her working time outside the farm sector, or where non-farm income is greater than farm income (part-time farms, subsidiary).[8] While in public debate farming is often associated with poverty, this study finds that Croatian full-time farms (type 1) fare best in a comparison of per capita incomes of the three farm types. Compared to those whose main income sources lie outside the agricultural sector (type 3), their income is more than 60% higher. This difference may be explained by the higher share of farming income (68% versus 33%), but a more plausible explanation may lie in the fact that farm income per hectare of land on type 1 farms is three times higher, in other words, their productivity is higher. Subsidiary part-time farms are also clearly disadvantaged in terms of access to subsidies: only 45% receive subsidies, and the average amount, € 560 per year, is 40% below that of the other groups, where more than 60% receive subsidies.

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

Farm type (N)		Per capita income, equivalent scale (€)	Farm income per ha of land (€/ha)	Farm share in total income (%)
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			
	χ^2	6.631	37.599	67.777
	p	0.036	0.000	0.000

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 income", whereas the total income also includes "unearned income".

Source: own calculation, N=173/163/173 farm households

[8]   This socio-economic classification is different from the EU typology 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 to allow them to fully employ the farmer and support his family.

Table 3, which compares income groups (tertiles), strengthens the notion that farming income makes a difference in terms of economic well-being. Again, the wealthiest group is characterised by having the highest farming income per hectare. There is also a clear trend showing that the better-off are not only more productive but cultivate larger farms in terms of arable land. The share of farm income is highest in the richest tertile (52%), but the poorest, too, are highly dependent on farming (50%). MCKINNON et al. (1991) state that the most vulnerable households are often characterized by poor access to land and, at the same time, by a high dependency on agricultural incomes. This relationship is depicted in table 4. Bigger farms are indeed better off; dependency on farm income, however, is clearly lower for smaller farms. Nevertheless, even those working on only three hectares or less rely on this type of income for more than one third of their total income.

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

	Income class (tertile)			All households	Test statistics χ^2 / p
	1	2	3		
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 (€/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

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.

Source: own calculation

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. The poorest group particularly, with a mere 22%, relies to a relatively low degree on non-farm income. Typically, poorer households have a high incentive but low capacity to diversify into non-farm activities. This issue was already discussed by LANJOUW (2007). They often remain relegated to poorly paying, low productivity, and risky jobs (BUCHENRIEDER, 2005; REARDON et al., 2007). For the middle-income class of 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.[9] The middle-income households seem to be characterised by their ability to find alternative employment in the non-farm sector, allowing them to compensate for low farming incomes. The poorest households, compared to the other two income groups, have a higher share of un-earned income (table 3). This could point to the fact that old age poverty is widespread in Croatian farm households.

Table 4.   Income according to farm size classes in Croatian regions, 2006

Farm size		Yearly income	
Class (N)	**Size**	Per capita income (€), equivalent scale	Farm income 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

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[9] 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.

Moreover, poorer households display a higher dependency ratio. Indeed, the average number of elderly persons is 1.5 in these households compared to 1.3 in the other two groups.[10] 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 as 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 is the trigger: households whose heads have only primary or even a lower education have twice the average poverty risk, 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.

Figure 1.   Income groups and share of non-farm incomes
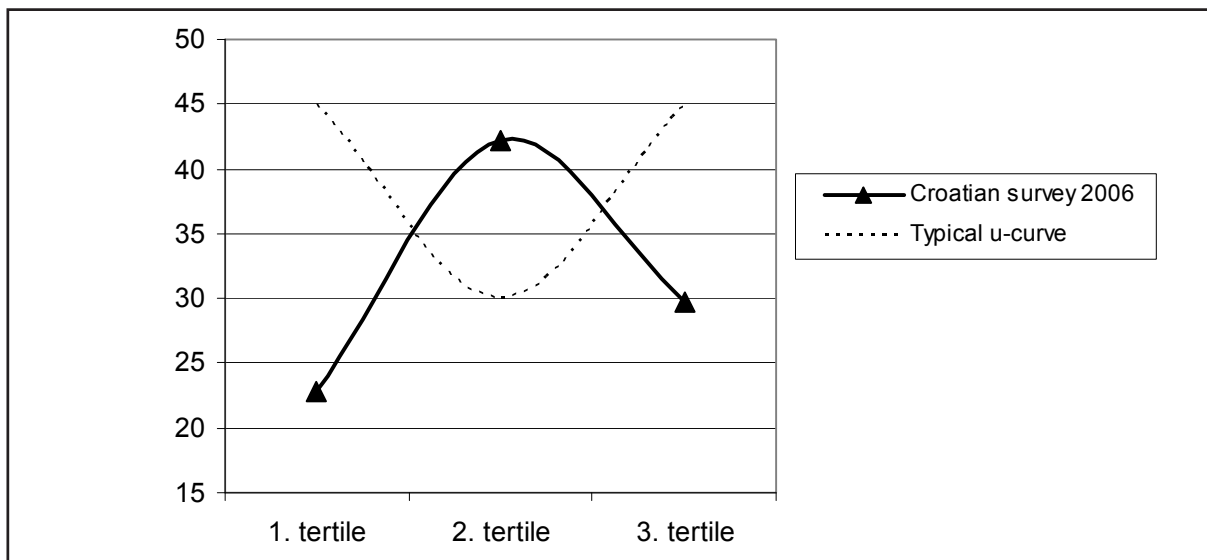
Source: own calculation

Surprisingly, the location of the households in either Zagreb county or Bjelovar-Bilogora does not seem to play a role in 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. At a mere 10% approximately, the poorest tertile earns an extraordinarily

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

low share of all incomes. The most affluent group, on the contrary, has access to two thirds of all incomes.

4.2 Poverty Incidence and Income Distribution

The risk of becoming poor in absolute terms is generally low in Croatia. However, much depends on the chosen indicators. The headcount index calculated on the basis of a USD 4.30 poverty line suggests that 4% of the farm households in the sample face absolute poverty[11] (table 5). An absolute poverty line estimated by the WORLD BANK (2006) on the basis of a 'cost of basic needs' approach comes to a completely different result: based on this measure, more than 20% of our sample households would be considered poor. On a relative basis, following the EU approach,[12] we find that slightly more than one quarter of the sample households fall below this line.

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

	Yearly income (€)	Headcount-index	Poverty deficit	Poverty severity	Share of persons shifted above poverty line due to	
					Non-farm income	Unearned income
Absolute poverty line 4.30 USD-line	844	0.04	0.08	0.32	8.30%	3.23%
World Bank estimate*	3,086	0.23	0.11	0.10	28.83%	11.95%
Relative poverty line 60% of median	3,382	0.26	0.12	0.10	29.82%	13.08%

*Note: Absolute poverty line estimated by the WORLD BANK (2006) for Croatia on the basis of a "cost of basic needs" approach for 2004 national incomes.

Source: own calculation

The measure of poverty severity considers income differences by giving more weight to the poorest. In other words, greater weight is given to households that are further away from the poverty line. This indicator shows relatively high figures for the sample households, meaning that there is considerable inequality in income distribution amongst the poor. The poverty deficit, defined as the average distance of the poor to

[11] This result can be compared to World Bank results of 2004, where 4% of a nation-wide sample fell below this USD-4.30 poverty line (WORLD BANK, 2006).

[12] According to the so-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).

the relative poverty line, is rather low at 12%, but considerably higher than the national figure of 2.4% for 2004 given by the WORLD BANK (2006). In our sample, a household can be lifted above the relative poverty line with an additional 405€ per year. The last two columns of Table 5 give revealing insights in terms of the impact that non-farm income and unearned income have. Depending on the chosen poverty line, non-farm income lifts between 8% and 30% of households out of poverty. The effect of unearned income is lower, but still considerable with up to 13%.

The upper part of table 6 shows the distribution of total household income in the sample based on the Gini coefficient. The income distribution was calculated exclude-ing non-farm incomes too. The national Gini coefficient for the year 2006 was 0.28 (CROSTAT, 2008). Compared to this relatively modest Gini coefficient, the Gini coefficient of 0.45 for the farm households in the sample indicates that income distri-bution is markedly more unequal. The question arises if non-farm incomes alleviate inequality or rather aggravate it? To answer this question we look at the Gini coeffi-cient, which was calculated without considering non-farm incomes. We find a notable increase in the Gini coefficient, namely 0.51. This implies that non-farm income con-tributes 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 income influences income distribution positively, farm incomes seem to have the most negative impact on income equality.[13]

**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 (elasticity in brackets)	
▪ on the basis of farm incomes	0.60 (0.196)
▪ on the basis of non-farm incomes	0.29 (- 0.098)
▪ on the basis of unearned incomes	0.12 (- 0.098)

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

Source: own calculation

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

The calculation of elasticities facilitates interpretation of the data with regard to marginal contributions of different income sources to income distribution (see Section 2). The elasticity for farm income is positive (0.196) and negative for non-farm incomes (-0.098). A negative elasticity indicates a positive impact on income distribution, i.e., the Gini coefficient will decrease when the respective income increases. In the sample, a 1% increase in non-farm incomes would lead to a decrease in income inequality of 10%.[14]

5   Conclusion

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

Income portfolios of Croatian farm households are highly diversified. Farming income makes up almost half of household income. But non-farm labour contributes significantly to income (almost one third). Its share, not surprisingly, is higher in the peri-urban region than in the typical rural one. 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 it is the poorer and richer households that tend to enter the rural non-farm economy. It nevertheless 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 for them. Land productivity varies, however, tremendously between different farm types. Income of full-time farms per hectare of land is more than three times higher compared to holdings where farm activities are subsidiary. For poorer households non-farm income makes the difference. Depending on the poverty line between 45 and 26% are poor. This number would be much higher if they had to rely on farm income only: 8% and 30% more persons would fall into poverty if they had no non-farm incomes; also unearned income helps to ease poverty considerably.

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[14]   KIMHI (2009) points out that such marginal effects (1) reflect uniform increases in non-farm income, which means that if richer households gain more than the poor the results could be reversed, and (2) the marginal effects are computed for households that already have the respective income source.

Non-farm income not only contributes significantly to the welfare of 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 income distribution, while farm incomes work in the opposite direction.

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). A consensus is emerging that agri-rural policies alone cannot do the job in rural regions. Hence, despite already highly diversified income portfolios and a 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 diversification of the rural economy would probably not only increase rural welfare, but also help to smooth income distribution among farm households.

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