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Returns from income strategies in rural Poland

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Abstract

In order to stabilize and improve their income situation, rural households are strongly encouraged to diversify their activities both in and outside the agricultural sector. Most often, however, this phenomenon takes on only moderate proportions. This paper addresses issues of rural households' income diversification in the case of Poland. It investigates returns from rural households' income strategies using propensity score matching methods and extensive datasets spanning 1998-2008. Results suggest that returns from combining farm and off-farm activities were lower than returns from specialization, namely, concentrating on farming or on off-farm activities. Generally, farming seems to be the most attractive option for rural households and income difference between farmers and those who combine farming and off-farm activities increased after Poland joined the EU.

Keywords: Income diversification, rural areas, propensity score matching, Poland
JEL: D31; O15; Q12

1. Introduction

Rural areas in Poland face significant challenges. Average income per capita of rural households is close to 80% of the average income in urban areas, while the service sector is less developed. The dependence on agriculture is one of the highest in the European Union (EU). Most remote areas are being depopulated due to a lack of economic and social opportunities and unfavourable demographic situation is likely to limit their growth opportunities and sustainability.

In response to this, one of the main objectives of the Polish rural development policy is to improve the quality of life in rural areas by encouraging diversification of rural economy. It is believed that promoting diversification of economic activities in rural areas may indirectly contribute to a decrease in hidden unemployment, to reduce fragmentation of land holdings, to stimulate their modernisation and improve their competitiveness and commercialisation (RDP, 2010). Thus, advocating diversification often rests on two premises. First, it is likely to improve efficiency of resource allocation. Second, it should help reduce poverty.¹ In case of transition countries diversification has been additionally advocated since farms in these countries have been expected to achieve a post-EU-accession increase in productivity with a net decline in agricultural employment (Chaplin et al., 2004). In this context, diversification has been promoted as a measure to absorb some of the surplus of farm labour. The policy measures aimed at achieving this include support for diversification into non-agricultural activities, support for the creation and development of micro-enterprises, provision of basic services for the economy and rural population or support for village renewal and development. These measures have been

¹ See Reardon et al. (2000) and Lanjouw and Lanjouw (2001) for background discussion.

implemented both during the pre-accession period as well as after Poland joined the EU and has been embraced by the Common Agricultural Policy (see e.g. SAPARD, 2007; RDP, 2010).

While support for income diversification in rural areas has gained a remarkable popularity, especially with political circles, these programmes take on only moderate proportions (Wilkin, 2003; Bład, 2006). For example, in the period 2002-2006 income diversification measures implemented within the pre-accession SAPARD programme and post-accession SPO programme provided funds for roughly 5.6 thousands applicants (SAPARD, 2007; SPO, 2008).² For comparison, it was expected that the number of beneficiaries from these two programmes would account for 13 thousands. While this relatively low participation rate (42%) was mainly explained by problems with administrative implementation (SAPARD, 2007; SPO, 2008), there is also evidence that some households are resistant to diversification strategies due to a preference for agriculture (Chaplin et al., 2004).

Moreover, the benefits of programmes encouraging farms to undertake non-agricultural activities are often questioned. Some experts argue that rural inhabitants are rational profit maximisers and nudging them to diversify outside agriculture will distort rural and agricultural markets away from their optimal levels. Furthermore, it may lead to overdependence of rural inhabitants on governmental support. Last but not least, it should also be noted that, according to official statistics, starting from 2005 farmers' income is constantly above the average observed in rural areas. This again questions the legitimacy of encouraging farmers to look for income outside agriculture from the profit-maximisation perspective.

Given that the Poland's rural areas contain over 38% of its population, it seems important to gain better understanding of the returns to various income strategies and to evaluate these two contrasting views using evidence from the data. Interestingly, while there have been some work that investigate the barriers to diversification in rural Poland (see e.g. Wilkin, 2003; Chaplin et al. 2004; Chaplin et al., 2005), there have been hardly any attempts to compare returns to income strategies of rural households. This paper is an attempt to fill this gap and provides a comparison of returns to various income strategies adopted by Polish rural households during transition. More specifically, the paper examines which of the five basic income strategies: relying solely on farm income, combining farm and off-farm employment (i.e. relying on diversified income), relying solely on off-farm income, self-employment, and living from pensions and state allowances (i.e. relying on unearned income), could have been regarded as the most profitable during the last decade. Such information is needed to evaluate rationale of governmental programmes aimed at stimulating farmers to diversify outside agriculture. It should also help in explaining labour adjustments in rural areas that were observed in Poland during transition period (Dries and Swinnen, 2002; Swinnen et al., 2005). Finally, by highlighting the most profitable rural income sources we aim to contribute to the

² SAPARD – Special pre-accession assistance to agriculture and rural development implemented in Poland in 2002-2004. SPO – Sectoral operational programme: Restructuring and Modernisation of the Food Sector and Rural Development implemented in Poland in 2004-2006.

ongoing discussion about the design of new rural development policy, both in Poland and at the broader EU level.

To reach this goal, we use Household Budget Surveys conducted by the Polish Central Statistical Office (CSO), covering the period between 1998 and 2008. Taking into account that Poland joined the EU in May 2004, we not only cover an important part of the transition process, but also the pre- and the post-accession period. Thus, the time coverage of our data allows us to highlight the impact of the introduction of Common Agricultural Policy (CAP) on rural/agricultural incomes. Importantly, we evaluate not only the impact of CAP on farm incomes alone, but also relative position of farmers towards other income-earning opportunities in rural areas. To address the concerns about differences in background characteristics of rural household undertaking different income strategies, propensity score matching methods are used. These methods allow to balance these characteristics before comparing outcomes. In other words, our estimates take into account that rural households differ in their composition, physical and human capital, and compare income after adjusting for these differences. To our knowledge, this is the first study concerned with rural areas in Central and Eastern Europe that uses such an approach to balance background characteristics before comparing incomes. As in most cases these background characteristics are not policy amenable, they should be taken into account when assessing how policies could affect choices of rural households.

The paper is organised as follows. Section 2 presents some background discussion of the relevant literature. Section 3 describes methodology and section 4 discusses data. Section 5 presents the obtained results on returns from various income strategies whereas section 6 summarizes our findings and concludes.

2. Literature review

Economic literature addresses a wide range of questions concerned with the underlying decisions of rural households' income strategy. Four strands of literature are of particular importance to this study. As already noted, diversification of rural economy towards non-agricultural income sources is often advised as a potential tool to alleviate rural poverty in developing and transition countries. This brings us to the first strand of literature which is relevant to us and focuses on the question whether increasing rural non-farm employment acts as a catalyst for a broader and inclusive pattern of development (see e.g. Lanjouw and Lanjouw, 2001; Reardon et al., 2001). To our knowledge, there is no study that addresses these issues for transition countries. Thus, we briefly review here the evidence from developing countries. A strong positive relationship between the share of non-farm income and total wealth levels was found for African countries as well as China (Reardon, 1997; Rozelle et al., 1999). Latin American countries and India provide evidence for U-shaped relationship indicating that obtaining the highest share of non-agricultural employment is a common facet of both poorest and wealthiest households (Reardon, 2000; Hazell and Haggblade, 1990). On the other hand, Deininger and Olinto (2001) found a strong positive association between total income and 'specialization', i.e. relying only on one main source, either on- or off-farm, in the case of households in Colombia.

The second strand focuses on examining factors stimulating or discouraging off-farm activities. The existing studies provide evidence that both endogenous and exogenous

factors matter in the diversification decision. Research identifying these factors in transition countries brings mixed conclusions. For Poland, the level of diversification was negatively related to the level of unearned income, the degree of specialisation within agriculture and remote localisation (Chaplin et al. 2004). On the other hand, the propensity to diversify was positively influenced by the level of education and frequency of public transport. This finding corroborates the statement that reallocation of rural labour in Poland was limited by low human capital of agricultural labour that constrained intersectoral mobility (Dries and Swinnen, 2002). While interesting, much of this literature is based on binomial models and thus neglects the whole heterogeneity of occupational choices. In consequence, the results obtained from these models are likely to disregard important differences between off-farm income strategies and their outcomes.

This line of reasoning ties into the third strand of large literature that studies off-farm labour supply of farmers (e.g. Huffman, 1980; Tokle and Huffman, 1991; Kimhi, 2000). The existing evidence links household's choice of its income strategy with two broad set of factors. The first set includes personal characteristics and household attributes. The second set refers to external factors that are most often reflected by regional characteristics. Much of the existing evidence concerns either developed or developing countries. In contrast, the evidence on transition countries is very scarce. Few examples include Goodwin and Holt (2002) for Bulgaria and Juvancic and Erjavec (2005) for Slovenia. In general however, the results from all these studies are quite unanimous. Numerous empirical evidences indicate that decisions about labour allocation highly depend on household's human capital endowments (see e.g., Lass et al., 1991). More specifically, off-farm work is first increasing and later decreasing with age of the head of a household. It is also closely related to the level of education of household members (Benjamin, 1994).³ Further, patterns of labour allocation are highly dependent on number of household members in working and non-working age (Ahituv and Kimhi, 2006, Kimhi, 1996).⁴ The specific demographic composition of the household (paying special attention to number of young and elderly dependents) is crucial because of the differential income effects resulting from the household's joint budget constraint and costs imposed by different household members (Kimhi, 2003; Phimister et al., 2004).⁵

³ Important to mention are findings provided by Ahituv and Kimhi (2006) and Jolliffe (2004) suggesting that schooling contributes to higher productivity in off-farm employment rather than in farm work. It should also be recalled that Deininger and Olinto (2001) found that more educated households are more likely to adopt specialised income generation strategies.

⁴ It could also be noted that higher family workforce might equip the household with higher social capital. The latter point is of particular importance from the point of view of overcoming constraints on information acquisition and transmission. It should be noted though, that the relationship between level of income and social capital is not certain. Positive impact of social capital on household performance and/or household income was stressed, among others, by Dwyer and Findeis (2008); Narayan and Pritchett (1999) or Grootaert (1998). On the other hand, Knack and Keefer (1997) and citations therein, provide examples where the investigated relationship was negative.

⁵ Substitutability or complementarity between the farm labour inputs of different household members should also be taken into account here. For instance, Kimhi (1996) indicates importance of time costs imposed on the household by small children. On the other hand, having elderly dependents in the household may increase adults' labour mobility. Further, Kimhi (2004) finds that off-farm participation of adults decreases as the number of elderly children rises.

The impact of access to unearned income sources should also be recognised here since these are likely to decrease the need for undertaking additional activities, either on or off-farm, by affecting the level of reservation wage.

The fourth strand has investigated adjustments in agricultural labour during transition. On the one hand, it has been argued that the central planning system left as its aftermath a huge surpluses in agriculture (Brada, 1989; Jackman, 1994). Therefore, it has been predicted that market-oriented economic reforms such as price liberalisation and cuts in subsidies should lead to outflow of labour from agriculture and thus be a natural factor encouraging income diversification in rural areas. On the other hand, it has been emphasised that agriculture has played a buffer role during transition by absorbing the excess labour from other sectors and providing food and social security (Seeth et al., 1998; Lerman et al., 2004; Macours and Swinnen, 2005). The empirical evidence is inconclusive and shows a substantial heterogeneity in labour adjustment patterns across transition countries (Swinnen et al., 2005). In Poland remarkable regional differentiation could be observed. Dries and Swinnen (2002) show that in the 1990s in southern and eastern parts agricultural labour increased whereas in northern and western parts it significantly declined. This seems to suggest that small family farms (that prevailed in the former regions) played a buffer role, whereas large scale farms (formerly state-owned, mainly present in the north and west of Poland) laid off agricultural workers during transition. While this literature provides an interesting picture of agricultural labour adjustment pattern, it lacks micro-foundations and thus does not allow studying individual incomes and underlying decisions of their income strategies.

To sum up, the existing literature shows that diversifying outside agriculture does not necessarily lead to an increase in income. In fact, several patterns characterising this relationship have been identified. We aim at documenting returns from various activities in rural Poland so as to see which pattern could be found there. In contrast to much of existing studies, we do not only distinguish between farm and off-farm income but also control for different off-farm strategies.

3. Methodology

Our aim is to quantify the average impact of a given income strategy on rural household income. A decision to follow an income strategy is possibly non-random. One should rather assume that selection into a given strategy depends on household characteristics. Thus, unadjusted difference in average income across various groups will give biased estimate of the returns to income strategies. To make meaningful comparisons, characteristics should be balanced across groups for which financial returns are compared (see e.g. Lee, 2005). Building on the microeconomic evaluation literature, we estimate income differentials across rural households using propensity score matching method, which adjusts for observable differences in household characteristics and endowments (see e.g. Blundell and Costa-Dias, 2008).

This method is widely used in empirical economics and other social sciences. The basic idea is to mimic a randomised experiment. In our context, receiving the ‘treatment’ is equal to pursuing a given income strategy. We distinguish between five different income strategies: relying solely on farming; combining off- and on-farm activities (diversification); relying solely on off-farm employment, relying on self-employment;

and relying on unearned income (pensions and social allowances). The treatment group can, for example, consist of households that rely solely on farming. In this case a counterfactual control group would consist of otherwise similar households but pursuing one of the remaining four income strategies, for example, combining farm and off-farm income.

More formally, we are interested in estimating $E(Y_{1i} - Y_{0i}|X_i, T_i = 1)$, where Y_{1i} is a potential outcome measure of household i that adopted a given income strategy, Y_{0i} a counterfactual performance of a household with different income strategy, X_i is a set of observable covariates, and T_i is an indicator for a given income strategy. This is the 'average treatment on the treated' (ATT). It measures the effect of a given income strategy on income levels for the treated households compared to what would have happened if they would not have adopted a given income strategy (i.e. they would have relied on different strategy). The ATT can be further decomposed to: $ATT = E(Y_{1i}|X_i, T_i = 1) - E(Y_{0i}|X_i, T_i = 1)$. The fundamental problem is that, in contrast to the first term, the second term on the right hand side is not observed. Therefore, a counterfactual needs to be constructed. The solution proposed by Rosenbaum and Rubin (1983) is based on the assumption that conditional on the vector X_i , the expected income in the absence of the pursued strategy is the same for treated and untreated households. This is the so-called *conditional independence assumption* which states that the set of observables contains all the information about the potential outcome (income in our case) in the absence of treatment. In other words, the selection into treatment is not dependent on unobservables. Hence, after adjusting for observable characteristics $E(Y_{0i}|X_i, T_i = 1) = E(Y_{0i}|X_i, T_i = 0)$. Accordingly, we can replace unobserved incomes in the treated households, had they not been treated, with observed incomes in those control households that have similar covariates X_i . In order to reduce the large dimension of X_i , we follow Rosenbaum and Rubin (1983) and instead of conditioning on X_i we condition on $p(X_i)$, which is the estimated probability of being treated and is called *propensity score*. Here we take advantage of the second assumption accompanying the matching procedure (the so-called *common-support assumption*) and assume that the propensity score is bounded away from 0 and 1 assuring that each treated observation would have its counterpart among the untreated.

It should be noted that this procedure assumes that after conditioning on observable characteristics there are no systematic differences between households pursuing different income strategies. However, as noted by Heckman et al. (1997) this might not be true and treated and untreated may differ in unobserved covariates. A potential solution is a difference-in-difference matching estimator. In our case however, this strategy is not feasible since longitudinal information on households is not available in our data. Nevertheless, our set of covariates includes crucial characteristics that are decisive for income strategies (see Section 2). Therefore we assume that by balancing these characteristics across income groups we control for selection in majority of cases.

Our applied empirical strategy consists of two steps. First, using a probit regression, we calculate the propensity score. Second, we use these propensity scores to find good matches for treated subjects in the pool of untreated. From several different matching algorithms used in applied research we employ two that are commonly used by economists, i.e. nearest neighbour one-to-one matching and local linear regression

matching (Heckman et al., 1997). Comparing results from both methods serves as a robustness check. In order to control for the matching quality we use a caliper with rather restrictive value of 0.005.

To assure the representativeness of our calculations, differences in incomes between treated and untreated were adjusted by household probability survey weights. Thus, the results are representative to the population of households. Standard errors were obtained through a clustered bootstrap with primary sampling units re-sampled for each bootstrap sample.⁶ Finally, to control for potential outliers in income data, we estimate average income differences using the trimmed mean of outcomes in the treated and the control groups, excluding 1% of extreme observations in each income group.⁷ Trimming provides more robust and more precise results, while the results hold in general for calculations based on whole samples.

4. Data

Our analysis uses the data from Household Budget Surveys (HBS) conducted annually by the Central Statistical Office (CSO) in Poland. This extensive survey includes information on household characteristics as well as details of their income, expenditure and assets. The HBS is a cross-sectional sample with ca. 32 000 households interviewed each year. For the purposes of our study only rural households were taken into account leaving slightly more than 10 000 observations for each year. The time span of the analysis ranges from 1998 to 2008 and is dictated by availability, coherency and comparability of the data.⁸

As noted earlier, throughout our analysis we distinguish between five different income strategies (farming, combining farm and off-farm activities, off-farm employment, self employment, and unearned income - pensions or social allowances). This classification is similar to the one used by CSO that is based on household main source of income (CSO, 1999). However, since 2005 CSO no longer distinguishes those who “combine farm and off-farm income” (diversified households). Therefore, the data for 2005-2008 period had to be rearranged so as to include all relevant income categories and to be comparable to the data for 1998-2004 period. To do so, we used information about household income sources. Households were classified based on their declared sources of income and diversified households were identified if off-farm employment was the most important

⁶ As noted by Abadie and Imbens (2008), in the case of the nearest neighbour estimator the bootstrapping does not necessarily deliver consistent estimates. Bootstrap, however, provides valid inference for all asymptotically linear estimators including local linear regression estimator. Therefore, again, the results based on the local linear regression estimator provide a useful robustness check for the results based on nearest-neighbour matching.

⁷ Koenker and Basset (1978) argue that trimming is greatly superior in case of non-Gaussian distribution. Income distributions are usually highly skewed with numerous outliers affecting statistics like mean (see also Koenker and Portnoy (1987) for additional discussion).

⁸ Individual level data concerning earlier periods are not comparable due to different sampling scheme. The more recent surveys are also designed differently in accordance with the EUROSTAT methodology. The methodology and the main results of the Household Budget Surveys are described in annual publications of the Central Statistical Office. More details on the methodology can be found in CSO (1999).

source of income and farm-income contribution was at least 5%.⁹ For the period 1998-2004 the correlation between our reconstructed classification and that used by CSO is over 95%. Thus, our classification reproduces the original classification before 2004 fairly well and we believe that it provides consistent categories over the whole analysed period, i.e. 1998-2008.

5. Results

For brevity reasons, we report our results only in words. To start with, over the whole analysed period, farming was more beneficial than relying on unearned income (pensions and social allowances) or than combining farm income with off-farm employment (diversification strategy). In addition, while farming and off-farm employment provided similar incomes in the period 1998-2003, farming seems to be more profitable since 2004. Over the analysed period only self-employment was generally more beneficial than farming but even this advantage seems to diminish more recently. Further, diversification strategy seems to be more profitable only than a strategy based on unearned sources. On the other hand, over the whole analysed period, it has provided lower remuneration than all other strategies, i.e. self-employment, farming or off-farm.

There are two key points to observe from these data. First, our results contrast with reforms applied to the Common Agricultural Policy, after which governmental efforts to promote diversification significantly intensified. As discussed in the introduction, several policies were implemented in Poland to encourage farmers to part with agriculture. However, we find that farmers faced strong financial incentives to do the opposite. Moreover, our results suggest that while diversified households could have been attracted by off-farm employment, they also have strong incentives to move back to farming. All these findings could explain why in Poland the programmes encouraging farmers to diversify their activities, notwithstanding high hopes pinned on them, have taken on only moderate proportions. Second point to be drawn from this analysis is that, while it is widely acknowledged that Polish farmers benefited from the Common Agricultural Policy, we show that joining the EU in May 2004 have not only improved farm incomes in absolute terms, but also contributed to a significant improvement in farmers' relative position towards other rural occupations. After 2004, income of households that solely rely on farming increased in comparison to all other households and this effect is quantitatively large. For example, while there was no difference between off-farm employment and farming in the period 1998-2003, since then the latter strategy seems to bring remuneration higher by 9% to 23% (depending on a year). Similar tendency could be observed when farming is compared to diversification strategy. Before the accession to the EU, depending on a year, the difference in returns from these two strategies accounted for 7%-22% to farmers' advantage. After the EU accession on the other hand it increased to 25%-50%.

The results presented above can be questioned as they are based on reported household income. It is often argued that publicly collected data do not cover all income sources because of still large shadow economy, especially in rural areas. In our case the data do

⁹ We have tested several thresholds for farming income and 5% makes our classification of households as close as possible to the original CSO data in years 1998-2004.

not contain any information on sources of income that are illegal. What follows, it might be argued that respondents could have tried to hide income sources that are not officially declared and our estimates are biased. Therefore, in order to check the robustness of our results, we repeat the matching exercise but this time using monthly expenditures (instead of monthly income) as our outcome variable. Our data contain quite precise information on household total spending that is difficult to manipulate as it is constructed by summing up daily expenditures. Obviously, these results cannot be identical to those based on earnings, as households might differ in their saving and investment behaviour, experience different prices, farmers might consume some of their own products etc. Nevertheless, they show that on average farmers spend more than households that rely on off-farm employment, especially after 2004, and that diversifying households spend much less than farmers and this gap increased over time. Overall, this leads us to conclude that our earlier findings are quite robust.

6. Conclusions

It is generally believed that economic diversification of rural areas may contribute to more efficient resource allocation and help reduce poverty. In this paper, we took a closer look at this issue by examining an extensive dataset from Poland spanning 1998-2008. In theory, diversification could provide an attractive alternative to other income strategies as rural households may still use their agricultural assets while also taking profitable off-farm employment. Drawing on propensity score matching method, we demonstrated however, that in rural Poland returns from diversification are lower than those from farming or off-farm employment. Diversification is only preferable in comparison to relying on government transfers (pensions or social allowances). Moreover, our estimates suggest that after Poland joined the European Union, rural households relying on farm income were better off than those relying on off-farm employment. The latter strategy is more profitable only for households with the highest levels of human capital and little land assets. On average, the highest remuneration provided self-employment but this strategy is only scarcely used.

Overall, our results suggest that over the period 1998-2008 farmers lacked financial incentives to (partly) quit from agriculture. As since 2004, i.e. the time Poland joined the EU, returns from farming are significantly higher than that obtained from other income sources, it is rather unlikely to observe a radical shift in this trend in the nearest future. We explain this phenomenon by considering a direct benefit that Polish farmers gain from the Common Agricultural Policy. The exact transmission mechanism through which this effect may happen is an interesting area for future research.

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