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ASSESSMENT OF TARGETING IN THE AUSTRIA INVESTMENT SUPPORT MEASURE FOR AGRICULTURE

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Abstract

Targeting is a central part of many public support schemes to increase cost-effectiveness of policy intervention. Interestingly, targeting in investment support measures of the Rural Development Programs (RDP) of the EU has so far received limited attention whereas targeting of agri-envionrmental measures has been the topic of many studies. In this article we investigate the effectiveness of targeting in the biggest Austrian investment support scheme. We find that 1) targeting could be increased if eligibility criteria were used more extensively, 2) the differentiation of aid-intensity levels is not making a difference for the allocation of funds and 3) selection through ranking by the managing authority seems to work through pre selection by the agricultural extension service. Even without touching the issue of which farms should be targeted, it is evident that effectiveness of current targeting could be increased.

Keywords

Targeting-effectiveness, Investment support measures, Evaluation

1 Introduction

The European Union allocated 96 billion Euro (ECA, 2012) in the period 2007-2013 to improve competitiveness, the environment and the quality of life in rural areas through the rural development policy. This amount was supplemented by mandatory national public and private co-financing. The Member States developed Rural Development Programmes (RDP) at national or regional level which comply with general guidelines at EU level. A total of 97 such RDPs were approved by the European Commission. Almost all RDPs included measures to support investments.

For investment measures, the European Commission requires member states to "ensure that support is targeted on clearly defined objectives reflecting identified structural and territorial needs and structural disadvantages" (EUROPEAN COMMISSION, 2006). A scrutinizing view reveals that Article 43 of CR 1974/2006 is ambiguous about the interplay of objectives and identified structural and territorial needs and disadvantages. For example, one objective of investment support is competitiveness. This objective might be best achieved by supporting investments of large-scale highly productive farms. On the other hand, supporting small-scale farms without the perspective of ever becoming as productive as large-scale farms may be justified by structural disadvantages.

Even though targeting is required for investment measures, the ways how this is done are not routinely evaluated by the European Commission. Neither is there – according to our knowledge – academic literature on targeting in the context of investment support measures. This is surprising, as there is a long tradition of scientific work on targeting in general (BIBI and DUCLOS, 2007; BLUNDELL et al., 1988; DUCLOS, 1995; HOUSSOU and ZELLER, 2011; SMOLENSKY et al., 1995; HECKMAN and SMITH, 2004; ALLCOTT et al., 2015). There is even a litera-

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ture strand on targeting for agri-environmental RDP measures (PIORR et al., 2009; UTHES et al., 2010; VAN DER HORST, 2007)[2]. Apart from academic literature, there is a valuable special report by the European Court of Auditors on targeting in investment support measures (ECA, 2012).

To increase cost-effectiveness through targeting it is necessary as a first step to understand which approaches to target funds to different groups exist and how they deviate from one another. We call the assessment on how well such an approach contributes to transferring funds to the targeted groups targeting-effectiveness. This concept is the topic of our paper and we apply it to a RDP for investment support measures from Austria. A related question, not addressed in this paper, is the influence of targeting on cost-effectiveness ("How much would cost-effectiveness change if other groups were targeted?").

2 Targeting in the EU investment support measures

In research on social policy, targeting is defined as "the identification of those who will or will not be eligible for a social program" (GROSH, 1994). The identification of the targeted recipients can be achieved by various approaches (SMOLENSKY et al., 1995) which differ in accuracy and administrative costs (HOUSSOU and ZELLER, 2011). Targeting in EU RDPs is done as part of the national programme design, but approaches to targeting are defined in a series of EU regulations (in particular No 1698/2005, No 1305/2013 and related regulations). There are three approaches to targeting at disposal for EU Member States (ECA, 2012):

- *Eligibility criteria* are a form of targeting by indicators and using a diverse range of attributes. They are used to define who or what is supported based on attributes like sector (e.g. forestry, agriculture or tourism), territory (e.g. below 500m altitude for a measure in Cyprus), investment costs (e.g. between 20,000 and 2 million Euros for a measure in Hessen), investment type (e.g. cultivation of fast growing trees for energy production for a measure in Czech Republic) or the type of beneficiary (e.g. beneficiary must be younger than 60 years for a measure in Poland)[3].
- *Aid-intensity differentiation* allows maximum fund rates to differ according to attributes of beneficiaries or projects. For example, in an investment support measure in Galicia (Spain) up to 25% of the eligible costs for investments by SME in the milk sector were supported while only 10% of eligible costs were supported by non-SME. In France, a top up of 15% was allowed for environmental investments in Natura 2000 zones. In Slovakia young farmers in less favored areas were supported with up to 60% while young farmers elsewhere were supported with up to 50%.
- *Selection criteria* for ranking are used by managing authorities to identify beneficiaries among all eligible beneficiaries. In comparison to eligibility criteria, selection criteria have no pre-defined cut-off point as it would depend on who applies and the budget available.

Eligibility criteria as well as aid-intensity differentiation are usually detailed neatly in the published programme documents. Selection criteria used by the managing authority, in contrary, are not always fully transparent. An example with published selection criteria is the measure "modernization of agricultural holdings" in Greece: Each application is rated according to a range of 52 weighted criteria. The weights show the preferences towards certain types of investments.

The different nature of the three approaches to targeting requires different methods for their evaluation. For *eligibility criteria* the first question is if there is a clearly defined target group. The "non-take up rate" is the share of those targeted but not participating (BLUNDELL et al., 1988). This is an interesting measure to quantify the coverage of the measure. *Aid-intensity*

[2] We thank an anonymous reviewer for pointing us to this strand of literature.
[3] Examples from the appendix of an European Comission (2014) report available from the authors on demand.

differentiation contributes to targeting if the groups with different aid-intensity end up with different investment support. *Selection through the managing authority* is only contributing to targeting if there is a binding budget constraint (i.e. more applications than available means). Evaluation of eligibility criteria and selection by the managing authority is relatively straightforward and of little relevance in our case study – as will be shown below. We consequently focus on how to evaluate aid intensity differentiation.

3. Case study: targeting-effectiveness of an Austrian RDP investment support measure

The Austrian version of the investment support measure "modernization of agricultural holdings" (which is the investment support measure with the highest funds in most RDPs) of the period 2006 to 2013 had a complex set of targeting. The eligibility criteria of the measure were designed to exclude inactive farmers: a minimum of 0.3 agricultural working units per farm, at least 3 ha cultivated land or 2 livestock units are required to qualify for support (exceptions apply for fruits-, wine-, honey- and hop producers). In addition, the applicant needed a certified training or had to have at least 5 years experience in farming. These indicator based eligibility criteria do not deter any active farmer from applying but prevent certain forms of misuse. We therefore assume that eligibility criteria did not contribute to targeting in our case study. We consequently do not further assess the contribution of eligibility criteria to targeting and focus on aid-intensity differentiation, the second approach to targeting.

Table 1: Overview of the supported measures, and aid-intensity

	Support	
Investments in:	% of eligible costs	% of interest
Replacment of existing capital	0	0
Not-specified investments (e.g. tractors)	0	0
Farm buildings incl. (technical) equipment	20	36
In-farm road construction	20	36
Honey bee farming equipment	20	36
Machinery & technical in-farm equipment	20	36
Permanent crops & protection investment	20	36
Harvester & manure trailer if jointly bought	20	36
Biomass heating plant	25	50
Regional/sectoral innovations	25	50
Processing & marketing related construction	25	50
Horticulture constructions	25	50
Stable constructions	25	36
Irrigation in fruit-cultivation	30	50
Animal welfare increasing stable investments	30	36
Agriculture on alpine pastures	50	50
Stables for organic farms	additional 5	--
Beneficiary in LFA	--	50
Max total aid intensity:		
in LFAs: 50.00%, other areas: 40.00%		

Notes: If a business plan is provided, 1000 Euro are added, LFA=Less Favored Area
Source: Simplified from the Austrian Programme document of the RDP (BMLFUW, 2013)

Aid-intensity was relevant for different kinds of investments. In Table 1 the types of investments and the respective aid-intensities are shown. Many, but not all investment types were qualified for support. Importantly, standard tractors were not supported. Specialized tractors (e.g. harvesters or environmentally less harmful manure distribution trailers) could be supported if jointly bought by several farmers. Pure replacement investments were not subsidized.

The third approach to targeting is selection by the managing authority. The selection criterion stated in programme document (BMLFUW, 2013) was "economic viability". In practice, though, additional criteria like environmental effects of the investment were considered as well. The assessments were based on information provided with the application. In many cases, farmers who were interested in applying for investment support, were consulting agricultural extension services of the chamber of agriculture. Those who were likely not to be supported did not bother submitting an application and therefore practically all applicants were granted a subsidy as long as resources were available. The managing authority consequently had no need to identify preferred investments via a ranking procedure. The preferences were stated by setting up criteria which were known to the agricultural extension service. Based on the data which are available it is not possible to account for quality heterogeneity in coaching. Given this design of the Austrian investment support measure between 2007 and 2013 the focus of the empirical analysis is the aid-intensity differentiation which is described below.

3.1. Description of data

The analysis of the case study is based on the raw data provided by LBG, an accountancy collecting and processing the Austrian data of FADN (farm accountancy data network). The data cover the period from 2003-2013. The data are organized as unbalanced panel with a total of 3,436 different farms. For each year the data cover a sample of around 2,100 farms. The sampling of the farms is based on strata (types of farming, economic size) and each farm represents between 13 and 327 farms of the population. The FADN bookkeeping data is supplemented by administrative data which detail support per farmer for the investment measure "modernization of agricultural holdings".

3.2 Estimation method to evaluated aid-intensity differentiation

Structural differences between the two groups explain different levels of support because different maximum aid-intensities were defined in the programme (e.g., those in a less favored area were supported up to 50% whereas those outside were only funded up to 40%). . One way of netting out these differences is by parametric regression. For example BLUNDELL et al. (1988) estimate the relationship between benefit levels and take-up of housing benefits in the UK.

For a non-parametric approach a matching algorithm can be used to find comparable farms among those fulfilling the criterion for higher aid-intensity with those not fulfilling them. Based on comparable groups it is then possible to calculate what difference the aid-intensity differentiation made. Following the terminology of causality analysis, the criterion would be the "treatment" and the aid transferred would be the "outcome". The estimate of interest is the "average effect on the treated" (ATT). It measures how much the average aid would have been for those who meet the criterion (e.g. those in LFA) if they had not met it (e.g. if they were outside LFA). Noting the average difference in funding between those meeting the criterion and those not meeting it as Δ the average treatment effect of the treated is defined as (CALIENDO and KOPEINIG,2008)

$$\Delta ATT = E\{E[Y(1)|D=1, X] - E[Y(0)|D=0, X]\} \qquad (3)$$

where Y(1) is the outcome if the criterion is met (D=1), Y(0) the outcome if the criterion is not met (D=0), X represents the covariates to secure the unconfoundedness assumption

(CALIENDO and KOPEINIG, 2008). The unconfoundedness assumption is not testable, but a covariate matchbalance can help to detect violations of the assumptions (note, however, a balanced matchbalance does not necessarily mean unbiased estimates). A wide range of matching algorithms is readily available in software packages. Compared to the frequently applied "propensity score matching", the more general "genetic matching" method improves covariate balance, especially when the variables are not ellipsoidally distributed (DIAMOND AND SEKHON, 2013). The commons support assumption requires secures that there are comparable treated and control observations. It is usually fulfilled by dropping observations which are not comparable.

If the unconfoundedness and common support assumptions are fulfilled, a significant difference in transfers after matching means that average transfers to those who meet the criterion differs at the indicated extent from those who do not meet them after accounting for structural difference captured by the covariates. The suggested approach hinges on the availability of a control group. A control group is typically available if the differentiation of aid-intensity is based on differences of the farm characteristic, e.g. being in a LFA. If there was no significantly higher funding after matching, aid-intensity differentiation did not contribute to the allocate funds to those targeted.

There is typically no control group if the aid-intensity differentiation is related to an investment type (e.g. investments in farm buildings). As can be seen from Table 1, the aid intensity for the majority of investments are 20% of eligible costs and 36% of interest payments. Though, some investments are supported more, like investments in stables increasing animal welfare standards (30% of eligible costs and 36% of interest payments) or investments in alpine pasture infrastructure (50% of eligible costs and 50% of interest payments). For most of the investments no control group is available because eligible farms were of the same type.. But for three type of the aid-intensity differentiations control groups are available.

- First, only those farms which have alpine pastures can invest in alpine pasture infrastructure. Such investments are supported by up to 50% of eligible investment costs. The control group are farms which are similar apart from having alpine pastures. They therefore have only access to investment support of 20 to 30% of eligible costs. For comparability we confine our analysis to types of farms where alpine pastures are frequent (mainly cattle farms and farms with a share of at least 25% of forestry).
- Second, organic farms which invest in stables are supported by 5% points more than conventional farms. Our control group are conventional farms. Again we limit the sample to cattle farms as the sample does not contain a sufficient number of organic farms of other categories.
- Third, there is a maximum investment support cap. This cap is 50% for farms in LFAs and 40% for farms in other areas. Even though this cap will hardly be binding, the differentiation can readily be evaluated using our framework. Our control group are farms located outside LFAs.

To identify comparable control group observations we need to find covariates which influence our "outcome" (the level of support during the programme period 2007-2013) to control for all confounding covariates which influence the level of support. We use covariates based on the average values of 2005 and 2006, thus before the programme period started. These covariates should explain the level of investments which in turn influences the level of funding. Using the average over more than two years would be possible, but given that the panel is unbalanced this reduces the number of available observations.

The investment decision can be seen as the result of two interconnected decisions (MERTON, 1982). First, the decision to consume now or to invest and consume later is made. Second, a decision is made on the investment portfolio. The first decision is likely to be systematically influenced by age of the holder of the farm. Those who are older are expected not to invest as much as a younger farmer (KIRCHWEGER et al., 2015). Other covariates which influence the consumption vs. investment decision are not available in the available data and therefore cannot be included as covariates (e.g. expectations about future prices, risk aversion or available information).

The second part of an investment decision is systematically influenced by the investment opportunities available for a particular farm. This would, first and most importantly, be determined by the farming type. Farms of different types will have different investment opportunities, given future expectations and technological developments during a given time. Because the farming type are particularly important in the investment decision, in a first model we compare only farms of the same farming type (through "exact matching") controlling only for age as additional covariate. Obviously "exact matching" is not required for evaluation of organic stable investments as in these cases we limit the sample to cattle farmers.

The size of the farm will also influence the level of investments in absolute terms (KIRCHWEGER et al., 2015). The size can be measured by a variety of indicators (e.g. cultivated area, total output or labor input). Cultivated area will be farm type specific, but since we only compare farms of the same type we consider the cultivated area as a well suited measure for measuring the influence of the size of the farm. To measure the cultivated area we put a lower weight on alpine pastures to correct for their lower production potential. To control for differing technology levels we add assets per cultivated area as covariates. Obviously, economies of size will make smaller farms more capital intensive but because we compare farms of similar size, this is not an issue in our analysis.

Another farm characteristic which potentially influences the investment decision is the level of liabilities. Farms with high liabilities might face higher opportunity costs as their future flexibility is reduced (ANASTASSIADIS and MUSSHOFF, 2014). To control for this effect we include financial leverage measured as debt to equity ratio as covariate. In applying the method, we assume that the described covariates explain the investment decision to control for confounding influences which would bias our estimated effect of aid-intensity differentiation. To control for potential non-linearities we add squared terms in the matching process if they are unbalanced otherwise.

We use three model specifications to evaluate each of the three aid-intensity differentiations. Model 1 only includes the age of the farmer and the type of farm. In model 2 the other covariates discussed above are added. In model 3 those observations which are likely to hamper fulfilling the common support assumption are dropped. To decide which farms to drop we use a procedure developed by CRUMP et al. (2009).

Obviously the unbiasedness of the estimated difference hinges on the assumption that the treatment and the control group is comparable with respect to their likelihood to invest. With respect to the observable farm characteristics a matchbalance can be used to check how well the distribution of the two groups match. For comparison we use a matchbalance consisting of standardized differences (Std. Diff.) as recommended by ROSENBAUM and RUBIN (1985) which should not exceed the value of 20 as a rule of thumb. Similarly, we use the ratio of variance (Var. Ratio) which should be approximate to the value of 1 (RUBIN, 2001). The debate in the econometric literature on which matchbalance measure is the most useful one and if it should be used as a stopping rule or whether it should be maximized is still ongoing (LEE, 2011). Though, there is a broad consensus that checking for balance is important in matching studies.

To assess the sensitivity of the estimated difference with regard to the assumption of no confounding unobservable covariates, we apply Wilcoxon's Sign-Rank ("Rosenbaum bounds") (ROSENBAUM, 2002, P. 114). All estimations were done with the statistical software R (R DEVELOPMENT CORE TEAM, 2015) and the packages "Matching" v4.8-3.4 (SEKHON, 2011).

Table 2: Estimated targeting-effectiveness: aid-intensity differentiation with respect to alpine pasture

	Number of obs. (un-weighted)	Farms with alpine pastures	Farms without alpine pastuers	Diff erence
Aid-intensity for alpine pasture infrastructure:				
eligible costs		50%	--	
interest		50%	--	
Aid intensity for other supported investments:				
eligible costs		20 to 30%	20 to 30%	
interest		36 to 50%	36 to 50%	
Estimated share of farms	1,248	0.27	0.73	
		(0.02)	(0.02)	
Estimated participation in measure	1,248	0.32	0.34	-0.02
		(0.03)	(0.02)	(0.03)
Estimated mean funding (Euro)	1,248	7,150	7,862	-712
		(999)	(550)	(1,162)
Estimated difference (ATT) of support between farms with alpine pasture and without after matching (Euro)				
Model 1: Comparison within farming type (exact matching) and age only	1,152	7,074	8,202	-1,127
				(936)
Model 2: Comparison within farming types, age and investment relevant vars. (see Note)	1,152	7,074	7,213	-138
				(1,490)
Model 3: Comparison within farming types, age and investment portfolio relevant vars. after dropping farms unique to treatment	1,151	7,069	7,734	-666
				(1,573)

Notes: Survey design based estimated values based on population figures in 2006. Only farm types where alpine pastures are observed used (cattle farms and forest-agri farms). Standard errors in brackets (Abadie-Imbens standard errors for matching results). Other relevant variables: area cultivated, area cultivated squared, assets per area cultivated, debt to equity ratio, debt to equity ratio squared. Significance level: *** = 1%, ** = 5%, * 10%

4 Results

The sample used to analyze the effect of aid-intensity differentiation with respect to alpine pastures consists of 1,248 cattle farms and forest holdings (Table 2). Survey design based estimates, suggest that 27% of these farms have alpine pastures (they are thus our treatment group). Of those having an alpine pasture (and thus being able to benefit from the higher support share) an estimated 32% took part in the measure "modernization of agricultural holdings" and obtained subsidies on average of 7,150 Euro. Of those not having an alpine pasture an estimated 34% took part in the measure and were supported by 7,862 Euro. The difference of 712 Euro between the averages of support is estimated not to be statistically significant. Figures in brackets in Table 2 are standard errors of the estimated means.

Table 3: Estimated targeting-effectiveness: aid-intensity differentiation with respect to organic agriculture

	Number of obs. (un-weighted)	Organic farms	Convent. farms	Diff-erence
Aid-intensity for investments in stables:				
eligible costs		30 to 35%	25% to 30%	5%
interest		36%	36%	
Aid intensity for other supported investments:				
eligible costs		20 to 30%	20% to 30%	
interest		36 to 50%	36% to 50%	
Estimated share of farms	971	0.29	0.71	
		(0.02)	(0.02)	
Estimated participation in measure	971	0.35	0.37	0.0
		(0.03)	(0.02)	(0.02)
Estimated mean funding (Euro)	971	7,774	9,446	-1,672
		(1,218)	(684)	(1,427)
Estimated difference (ATT) of support between organic and conventional after matching (Euro)				
Model 1: Comparison within farming types (exact matching) and age only	836	8,154	9,821	-1,667
				(1,155)
Model 2: Comparison within farm types, age and investment portfolio relev. variabl. (see Note)	836	8,154	8,876	-722
				(2,104)
Model 3: Comparison within farm types, age and investment portfolio relevant variables after dropping LFA unique farms	836	8,154	8,876	-722
				(2,104)

Notes: Survey design based estimated values based on population figures in 2006. Standard errors in brackets (Abadie-Imbens standard errors for matching results). Other relevant variables: area cultivated, area cultivated squared, assets per area cultivated, debt to equity ratio, debt to equity ratio squared. Significance level: *** = 1%, ** = 5%, * 10%

Accounting for potential counfounders, the bottom panel of Table 2 reveals that for all three model specifications the average funding is not significantly different between those farms which have the option to invest in infrastructure on alpine pastures and those which do not have this option. From the matchbalances for the three models it can be concluded that the distribution of covariates is more balanced in model 2 than in model 1 (Table A1, A2, A3 in the appendix available online[4]). Model 2 and 3 are generally acceptably balanced, except for the covariate "assets per cultivated area" which is higher for farms without alpine pasture (the average is 1% higher in model 2 and 25% higher in model 3). Since no significant difference is found, the influence of unobserved confounders (Rosenbaum bounds) is of limited importance (for the results see Table A10 in the online-appendix).

4 http://www.wiso.boku.ac.at/ulrichmorawetz.html

Table 4: Estimated targeting-effectiveness: aid-intensity differentiation with respect to location in Least Favored Area (LFA).

	Number of obs. (un-weighted)	LFA	Other areas	Diff-erence	
Maximum aid-intensity: eligible costs + interest		50%	40%	10%	
Estimated share of farms	2,114	0.54	0.46		
		(0.01)	(0.01)		
Estimated participation in measure	2,114	0.33	0.27	0.06	***
		(0.02)	(0.01)	(0.02)	
Estimated mean funding (Euro)	2,114	7,222	5,380	1,842	***
		(511)	(390)	(657)	
Estimated difference (ATT) of support between LFA and others after matching (Euro)					
Model 1: Comparison within farm types (exact matching) and age only	2,036	7,011	8,407	-1,396	
				(1,314)	
Model 2: Comparison within farm types, age and investment relev. variab. (see Note)	2,036	7,011	9,346	-2,335	
				(2,170)	
Model 3: Coparision within farm types, age and investment portfolio relev. variables after dropping LFA unique farms	1,868	6,995	9,924	-2,930	
				(2,215)	

Notes: Survey design based estimated values based on population figures in 2006. Standard errors in brackets (Abadie-Imbens standard errors for matching results). Other relevant variables: organic management, area cultivated, area cultivated squared, assets per area cultivated, debt to equity ratio, debt to equity ratio squared. Significance level: *** = 1%, ** = 5%, * 10%

The sample used to analyze the effect of aid-intensity differentiation with respect to organic farming consists of 971 cattle farms (Table 3). Survey design based estimates suggest that 29% of these farms are organic (and are thus our treatment group). Among the organic farms (and therefore receiving a 5% points higher support for investments in stable) an estimated 35% took part in the measure "modernization of agricultural holdings" and were supported on average by 7,774 Euro. Among the conventional farms an estimated 37% took part in the measure and were supported by 9,446 Euro. The difference between the average support is estimated not to be statistically significant.

Accounting for potential counfounders, the bottom panel of Table 3 reveals that for all model specification the average funding is not significantly different between organic and conventional farms. From the matchbalances we find in particular model 3 to be well balanced (see Table A4, A5 and A6 in the online-appendix).

The sample used to analyze the effect of higher maximum aid-intensity for farms located in LFA consisted of 2,114 farms (Table 4). Survey design based estimates suggest that 45% of the farms are located in LFA (and are therefore our treatment group). Among the farms located in LFA an estimated 33% took part in the measure "modernization of agricultural holdings" and were supported on average by 7,222 Euro. Among the farms located outside of LFA an estimated 27% took part in the measure and were supported by 5,380 Euro. The difference of 1,842 Euro higher funding in LFA is statistically significant on a 1% level (survey design based standard errors).

After accounting for potential counfounders, the bottom panel of Table 4 reveals that for all three model specification the average funding is not significantly different between farms within and outside of LFAs. The substantial change in the treatment effect is due to the systematic difference between farms located in an LFA. From the matchbalances we find in particular model 3 to be well balanced (see Table A7, A8 and A9 in the appendix).

5 Conclusions

In contrast to social policy, targeting has hardly been evaluated quantitatively in investment support measures of the rural development programmes. This is surprising as targeting-efficiency is an important criterion to identify those approaches to targeting that work well in practice. Only if targeting-effectiveness is well understood, it is possible to use a well designed approach to increase the cost-effectiveness of RDPs.

During the programme period 2007-2013 various approaches to targeting were available to EU Member States. One observation we made is that the criteria used for targeting are very specific on a large number of details but very blurred with respect to specific objectives of the programme under consideration. We have the impression that either the objectives of the programme are so well known that any further reference to them is unnecessary or that those involved in targeting did not need to take care of the overall objectives. Three targeting approaches were analyzed in depth.

The first approach to targeting are eligibility criteria. Eligibility criteria of this Austrian investment support measure were designed to prevent participation of non-farmers or non-active farmers. The criteria were met almost by default by the farms of our sample. We conclude that targeting could be increased by choosing eligibility criteria which actually limit eligibility to a subgroup.

The second approach to targeting was aid-intensity differentiation. Depending on the type of investment, type of farm and location of the farm the aid-intensity differed. We use these differences, where possible, to test if these differences in aid-intensity make a difference in the average funding. We expected that farms which have alpine pastures would receive on average higher investment support than comparable farms without alpine pastures. Our analysis shows that this was not the case, even after controlling for confounding factors. This can be either because 1) farms with alpine pastures did not invest in alpine pasture infrastructure because even a higher support rate made the investments not profitable, or 2) because farms with alpine pasture do invest in alpine pastures infrastructure but invest less otherwise. A credit or time constraint could be an explanation for 2). In any case, farms with alpine pastures did, on average, not receive more support than those without.

We also compared investment subsidies for organic cattle farms and conventional cattle farms. Organic cattle farms received 30 to 35% investment support if they invest in stables while conventional farms received 25 to 30%. We did not find a significant difference in the investment subsidies between organic and conventional farms even after controlling for confounding factors. We thus conclude that the 5% points higher investment support for organic farmers did not make a difference in the average funding.

There is also an aid-differentiation with respect to the location of the farm. Farms located in Less Favored Areas (LFAs) could receive up to 50% of eligible costs while farms located elsewhere could receive up to 40% of eligible costs. Given that the majority of investment support is well below 40% it is not surprising that we did not find a significant difference in average funding after controlling for confounding factors.

The main conclusion is thus that in the Austria investment support measure none of the aid-intensity differentiations we analyzed did contribute to allocate funds towards those with higher aid-intensity. RDP objectives (like support for structural disadvantaged areas through a higher aid-intensity maximum in LFAs, or like environmental improvement through higher investment support of organic farming) are not fostered through aid-intensity differentiation.

The biggest influence on the allocation of transfers probably was the choice of what kind of investment is supported (e.g. support of biomass heating plants) and what not (e.g. tractors). From a list of possible investments not supported one might get an idea of how the choice of supported investments relates to the objectives of the RDPs. But as we do not know what investments farmers would make if there was no investment support, we cannot quantify this effect.

The third approach to targeting is selection by the managing authority. In the Austrian case almost all applicants were granted support. This can be explained by a pre-selection of applicants at the level of agricultural extension services through coaching. But detailed data to substantiate this are lacking.

Summarizing the assessment of the targeting efficiency for the case study of the Austrian measure "modernization of agricultural holdings" we find that 1) eligibility criteria were hardly used for targeting 2) maximum-aid intensity differentiation did not contribute to targeting 3) selection by ranking cannot be evaluated because data are not available. One should thus ask what determined the allocation of investment support. One likely influence is which type of investment is supported. Cash crop farmers are more likely to invest in specialized tractors (which are supported only if jointly acquired), while cattle farmers are more likely to invest in stables (which are supported). The effects of such differentiation are practically not to evaluate as no control groups are available. If a targeting concept is more explicit on particular farmers or farm types than the Austrian case study, this difficulty in evaluation wouldn't even occur. For transparency we therefore suggest that targeting criteria should be explicitly related to specific programme objectives.

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