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SCIENTIFIC ARTICLE

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Marketing and subsidy effects on farm income distribution: evidence from Kosovo

ABSTRACT

This paper investigates the effect of instruments of agricultural policy support and marketing contracts on the farm income distribution in Kosovo. Unconditional quantile regression was employed allowing for heterogeneity in preferences and risk aversion. The empirical results indicate that several policy measures and some attributes of marketing contracts exacerbate income inequality. Direct payments and more detailed marketing contracts favour disproportionally the higher income farms. Investment subsidies and improved buyers' compliance with the terms of marketing agreements, on the other hand, are most beneficial to the lower income farmers and thus can result in more equitable farm incomes distribution. The large share of direct payments in the present agricultural budget in Kosovo is therefore misplaced since it uses scarce public resources without improving the situation of small low-income farms.

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Introduction

This paper is motivated by the fact that, despite being one of the poorest countries in Europe, Kosovo dedicates a substantial budget to agricultural support. Kosovo has a polarised farming structure, characterised by a small number of large farms, relative to the mean size domestically, and a large number of small farms. The possible differential impact of agricultural support policies on farms along the agricultural income distribution is, therefore, an important policy issue. In this regard, it is assumed that policies that target the incomes of low-income farms are more desirable, since they will both benefit the lower income farms and simultaneously reach a larger number of farmers. However, while the policy objective of the two main public policy programmes in Kosovo – direct payments and investment subsidies – has been to achieve production growth, converting output growth to farm income "means that attention also needs to be paid to the promotion of market access" (da Silva and Rankin, 2013, p1). Contracts for agricultural products are an important way in which farmers can market their produce.

The objective of this paper is to reveal empirically who exactly benefits most from agricultural support and market access with a focus on one mechanism to facilitate market access in particular, namely contracts with the downstream sector. Kosovo is particularly well-suited to studying the effect of contract farming since the biggest issue of agricultural sector is that in the largely semi-subsistence agricultural sector farmers face high transaction costs to access the market (e.g. Latruffe and Desjeu, 2014; Kostov *et al.*, 2021).

This paper employs unconditional quantile regression to reveal how different parts of income distribution are affected by public policy programmes and marketing opportunities. The study uses unique data collected in the second half of 2019 through a survey organised by the Ministry of Agriculture, Forestry and Rural Development (MAFRD). The objective of the survey was to assess the impact of financial support programmes, provided by MAFRD and implemented by the Agency for Agricultural Development (ADA), on agents alongside the food chain. Concerning farming, in addition to the impact of financial support through direct payments and investment subsidies, the Ministry aimed to collect information on various other aspects of farm activity, e.g. the structure of farms, crops and livestock production, input expenditure, sales channels etc. The data referred to 2018. To the best of our knowledge, this is the first attempt comprehensively to analyse the farmers' panel dataset.

The results show that while the lowest income farmers benefit more from investment subsidies, direct payments widen the gap between the low-income and high-income farmers. Where contracting arrangements are concerned, buyers' non-compliance is most damaging to the lower income farms. This raises the issue of low enforceability which allows the buyers to deviate from contractual terms ex-post.

The paper is structured as follows. The next section provides a contextual background for the study, which is followed

by an overview of agriculture policy in Kosovo. Section four presents the conceptual framework, while the fifth section discusses the data and the construction of variables. Section six presents the empirical methodology and section seven discusses the results. Section eight concludes.

Study background

In many countries in the world farm incomes have been a major focus of agricultural support policies, directly or indirectly. There are several strands in the agricultural economics literature which, using different methodologies, investigate the effect of agricultural support on farm incomes emphasising different aspects. A strand in literature, which is most relevant to the present paper, deals with the distributional consequences of agricultural policies (e.g. Allanson, 2006; Mishra et al., 2009; Moreddu, 2011; Severini and Tantari, 2013; Deppermann et al., 2014; Piet and Desjeux, 2021; Hanson, 2021). Most, but not all, of the studies dealing with the effect of policy payments on income distribution used the Gini coefficient. Since the Gini coefficient is a scalar measure of inequality, it is ill suited to the present context. Such an approach may show whether some measures increase or decrease income inequality, but it cannot identify which specific segments of the income distribution benefit most, or the magnitude of those benefits. Hence, it cannot provide a basis for policy recommendations targeting specific groups of farms.

The contribution of the present paper is not simply to reveal whether the income distribution becomes more or less equal, but also how the different parts of this distribution are affected by policy support and marketing opportunities. Combining the effects of different instruments of public policy support and marketing environment on agricultural incomes for different income groups provides a much better comparative perspective not only of who exactly benefits most from such measures, but also which are better suited to help poorest farmers by boosting their incomes.

In this paper, the use of the concept of downstream contract farming follows the FAO definition as an agreement between farmers and buyers on the conditions of the production and marketing of farm products (FAO, 2017). Contracts represent intermediary forms of organisation that fall between the classical dichotomy of hierarchies (i.e. firms, farms) and markets. Unlike the hierarchies which centralise decision-making and the markets which take them outside of the farm control, hybrid forms such as contracts translate into some sharing in decision-making between the transaction partners (Ménard, 2004). The contracting process reduces uncertainties and, hence, can facilitate decision-making under volatile markets. It can potentially bring substantial benefits to farmers, e.g. higher efficiency (Mishra *et al*., 2019), higher subjective feeling of happiness (Dedehouanou *et al*., 2013), and decrease in marketing risk, but it also has its downsides, including loss of autonomy of a contract farmer, higher dependence on particular buyers, and a need to change some production and marketing practices.

There is an extensive empirical literature on the effect of contracts on farming incomes (see e.g. Ton *et al*., 2018 for an overview of such studies). This literature considers some type of treatment effects of contracting. The typical question in such studies is what is the effect of contracting on incomes, frequently employing a binary treatment. This is, however, a different question to the one researched in this paper, i.e. how the effects of contracting, and other policy instruments, vary across the farm income distribution.

There is a wide variety of contracts, from full resource provisioning contracts with detailed production and marketing conditions to mere verbal agreements to buy whatever quantity is produced at the going local market price. Even attempts to broadly classify downstream contracts have yielded many typologies. For example, Eaton and Shepherd (2001) define five types of contractual arrangements (nucleus, informal, centralised, multipartite and intermediary). Subsuming such a large variation into a single category is, therefore, likely to invalidate any empirical findings. Hence, any meaningful investigation of the effect of contracts would need to look at their characteristics since different contracts can have very different effects (see e.g. Ruml *et al*., 2020).

Contracts in agriculture are usually incomplete (Wu, 2014). Since the market power is asymmetric, the stronger party, normally the buyer, has a margin to deviate *ex post* from the contractual arrangements and unilaterally revise the contract terms (Barrett *et al*., 2012; Gorton *et al*., 2017; Di Marcantonio *et al*., 2020). The interaction between the contract parties determines the efficacy of a contract scheme probably more than the characteristics of the scheme itself. Examples of failed contractual arrangements include cases of poor coordination among parties, unfavourable terms and conditions, and post determination of prices (Da Silva, 2005). It is, therefore, important to consider the possibility of violation of the agreed contract terms, particularly since one of the very reasons for existence of contracts, such as information asymmetry, may dis-incentivise parties and cause them to violate the contract terms (Saenger *et al*., 2013). Multidimensional character of contracts makes enforceability more difficult and the breach of contract conditions easier (Barrett *et al*., 2012). This is observed in Kosovo with buyer non-compliance with the contract terms frequently occurring. Given these complexities, this paper examines both the specific characteristics of contractual arrangements and the degree of contract compliance; thus, it analyses the substantive nature of these agreements rather than their mere existence.

Brief overview of agriculture policy and marketing in Kosovo[1]

Kosovo is one of the poorest countries in Europe. In 2018, the year for which MAFRD survey collected data, the GDP per capita was only €3,746 and agriculture contributed 7.2 per cent of GDP (MAFRD, 2020; DEAAS, 2021).

[1] Although more recent statistics are available, most of the information in this section refers to 2018 as this is the economic and policy background against which the farm level data used in the analysis was collected.

Kosovo's agriculture is characterised by serious structural problems. These include land fragmentation, low labour productivity and high production costs (MAFRD, 2018). The majority of farms are very small in physical size. As informed by the Agricultural Household Survey, carried out by the Kosovo Agency of Statistics, in 2019 there were 105,289 agricultural holdings (MAFRD, 2020). According to land area, the largest proportion – 69.7 per cent were smaller than 2 ha, while only 1.5 per cent were larger than 10 ha, the latter accounting for 18.3 per cent of all arable area.

Two programmes for support to agriculture have been implemented, copying to a certain extent Pillar 1 and Pillar 2 of the EU Common Agricultural Policy (CAP) – direct payments as per Pillar 1 and investment subsidies (grants) as per Pillar 2 – rural development. The amounts allocated to these two programmes in 2018 were €29.6 and €31.0 million respectively (DEAAS, 2021). Most of direct payments were coupled – crops were supported based on hectares cultivated, while in the livestock sector the payments were disbursed mainly per head.

In 2018, the total number of applicants for direct payments was 50,054 of which 48,320 were successful and only 1,734 (3.5 per cent) were rejected mainly due to the lack of necessary documents (MAFRD, 2020). The small percentage of rejection has been typical over the lifetime of the programme. Therefore, the applicants for direct payments could have reasonable expectations to be successful.

Kostov *et al*. (2021) analysed the effect of subsidies on farm commercialisation in Kosovo. They argue that since direct payment recipients have to meet some conditions, most often concerning a minimum size, larger farms may be able to attract more direct payments. If this is the case, then direct payments would disproportionally benefit larger farms and, hence, exacerbate the income differential between poorer and better-off farmers. Such an outcome would, however, be undesirable consequence of agricultural support measures.

Investment subsidies under the Rural Development programme have been aimed to support investment not only in farming but also in the processing industry, marketing, rural businesses, as well as irrigation. In 2018, 618 projects were supported (DEAAS, 2021). The projects were under several rural development measures: investments in physical assets in agricultural holdings; investments in physical assets in processing and trading with agricultural products; diversification of farms and business development; irrigation of agricultural lands; implementation of local development strategies; and a special programme for the socioeconomic integration of small farms – the only initiative exclusively focused on small farms.

Concerning marketing channels in Kosovo, Gjokaj *et al*. (2017) provide a detailed analysis of horticulture sector. They argue that the most widespread form of marketing in horticulture are informal contracts between farmers and buyers, and there are multiple problems in respect of these contracts. The latter relate to ascertaining quality and safety standards, as well as enforcement and implementation of the contracts. The authors suggest that government support is necessary at the level of farmers associations by commodity, e.g. association of fruit, vegetable, wheat producers, potatoes growers, milk farmers etc. The reason for this is that the associations are in close contacts with the farmers, and both processors and farmers trust the associations.

However, still, there is no public support programme for contract farming in the national agricultural policy. Foreign donors (USAID, 2005) have initiated projects to support the implementation of contract farming and capacity building. The main constraint to contract farming revealed by these projects was the lack of trust between the parties. The lack of trust can create incentives for both parties to deviate from the conditions of the contracts, particularly if these are informally defined, or if their terms are not clearly defined and enforceable. Therefore, the characteristics of such contracts are a main feature that can affect the way contracts are used and their effect along the income distribution.

Conceptual Framework

There is a substantial literature on the income effects of various instruments of agricultural policy – direct payments and subsidies in general. These are characterised by large spillovers up and down the supply chain. The extent to which farms lose residual income to suppliers and consumers depends on their relative market power. Therefore, it is logical to expect that larger, i.e. better-off farms should be able to keep a larger share of e.g. the direct payments compared to smaller farms.

Investment subsidies, on the other hand, may have larger income effect on lower income farms. First, the relative increase of productive capacity of investment subsidies would be much larger for smaller lower income farms compared to larger farms. Moreover, the transformative impact of such subsidies is expected to be greater for smaller farms. Investing shows commitment to market behaviour away from semi-subsistence attitudes that are stronger at the lower end of the income scale and, therefore, investment would be much more transformative for these farms compared to their better-off counterparts. Hence, investment subsidies are expected to produce greater benefit for lower income farms.

The issue of marketing arrangements, however, is more complex. We considered two distinct measures of the marketing contracting arrangements, namely contract enforcement and contract coverage. Better contract enforcement reduces risk and therefore should have greater effect for more risk averse farms, i.e. those at the lower end of the income distribution.

The contract coverage, on the other hand, imposes some additional compliance costs on farms, which have to be balanced against the reduced risk. So, in principle, the effect of contract coverage will depend on the trade-off between the risk reduction and the compliance costs. In the particular context of Kosovo, where most farms are rather small and consequently both more risk averse and simultaneously less willing to cover such compliance costs, it could be expected that only the higher income farms would be able to derive more benefit. As for the other farms, it is difficult to say which ones would be able to derive more income from contract coverage. Hence, the differential

effect of contract coverage is more uncertain, except that it is expected to be higher at the top end of the income distribution, but it may be unevenly distributed amongst the other farms.

It can be shown that under heterogeneous preferences (full details of the utility framework based on quantile preferences are available from the authors upon request) the following *a priori* expectations about the effects of the contracting arrangements on income distribution can be derived. First, contract enforcement will benefit more lower income farms and this effect will diminish with the income level. Second, the higher income farms will benefit more from contract coverage. Third, the relative differential impact of contract coverage on lower- and middle-income farms is not clear in the sense that is not *a priori* known which of these groups will benefit more.

Data and variables construction

As stated previously, the study uses unique data, collected in the second half of 2019 through a survey organised by the MAFRD. The survey included several panels in respect of pre-determined agents along the food chain – farmers, food processors, traders and consumers. For this paper, the data from the farmers panel is employed. The caveats are the cross-sectional character of the data and the lack of information on output and prices. However, what is useful for the analysis in the paper is the data on farm and off-farm incomes, and detailed information on various support instruments and the policy beneficiaries. For many variables the survey collected information not only for 2018 but also for the past 5 and 10 years. The latter allowed us to define some support variables e.g. investment, as explained below.

The interviews were conducted by enumerators in person. For the sample, initially the list of all farmers registered with the Agricultural Development Agency was consulted.

Table 1: Pre-specified contract attributes

Contract attributes
Quantity to be purchased
Minimum purchased quantity
Fixed price
Price range (minimum and maximum price)
Variable price based on quality (premium quality)
Payment time
Frequency of delivery
Minimum quality
Requirements for the type and amount of inputs (e.g. pesticides, feed or veterinary procedures / sanitation)
Obligation to purchase inputs from the buyer
Packaging requirements
Penalties for termination of the contract
Services to be provided by the buyer
Problem solving mechanisms
Duration (lifespan) of the contract

Source: Own composition

Out of this list, 1,000 beneficiaries of agricultural policy support and 200 non-beneficiaries were selected randomly. Geographically, the survey covered all 6 regions in the country with the highest number of respondents in the region where the capital Pristina is located – 327 or 26.1 per cent.

Preliminary inspection of the data led to removal of observations where there were missing values in the variables of interest. As a result, the sample used in the analysis includes 540 observations. The investments measure reflects investments carried out over the last 10 years. Although the survey recorded the specific year of every piece of investment, these are not disaggregated by year in order to avoid fragmenting the data by time lag. Doing so would reduce the number of observations for each such lagged effect, thereby limiting the statistical power of the analysis.

The direct payments (DP) variable captures the coupled payments received in 2018 in the sample analysed. For completeness, the so-called *ad hoc* subsidies obtained by farmers in the same year were added to it. In the sample, only 25 farms obtained such support normally coming from the municipality in addition to what they received from the Ministry budget, and the amounts received were relatively small. The major difference between DP and investment subsidies, is that the DP are essentially a flow variable which is added to the current year cashflow of the operators. All farmers in the sample used have declared that they had received direct payments.

Some control variables employed were age, gender - an indicator variable with values of 1 indicating males and 0 females, education – an ordinal variable with natural hierarchy measured by a 5 points scale with higher values indicating higher levels of education.[2] All these variables referred to the farm owner (head of the household).

Three variables which measure the contracting and marketing environment in which farms operate have been employed. While in developed countries the existence and operation of effective marketing structures is often assumed as given, this is not the case in transition economies such as Kosovo. Indeed, the nature of market access, the difficulties in obtaining it and the consequent lack of market participation due to high transaction costs and information asymmetry are persistent issues in transition economies. The variables we used are contract coverage, buyer non-compliance and ease to change a buyer. Contract coverage measures the extent to which farmers' contracts with buyers cover different conditions and contingencies (a proxy of contract completeness). For farmers who did not have any buyers contracts this variable takes a zero value, while for farmers who have such contracts, irrespective of their nature (written, verbal or other), this variable counts how many of the 15 pre-specified attributes in the questionnaire are included in the contract. The pre-specified attributes are presented in Table 1. The more of these attributes are present in the contracting agreement, the better defined the marketing outcomes will be and

[2] Since it would not be reasonable to expect that moving between two adjacent education categories would always have the same effect, it would have been more realistic to express education as a set of indicators. However, in this study the main analytical focus is on the effect of public support and contract farming, and for this reason we use a single ordinal education variable as a very rough control indicator.

Table 2: Summary statistics.

	Mean	Standard deviation	Min	Max
Agricultural Income (€)	9,586	19,939	120	234,000
Non-agricultural Income (€)	8,867	37,921	90	576,228
Investments(€)	37,925	87,835	0	957,000
Investment Subsidies(€)	13,647	36,020	0	434,000
DP (€)	1,478	3,283	100	54,000
Age (years)	48	14	20	85
Gender (male=1)	0.89	0.32	0	1
Education (1-5)	3	1	2	5
Contract coverage (count)	5	4	0	15
Buyer noncompliance (count)	2	3	0	15
Ease to change buyer (1-5)	3	1	1	5

Source: Own calculations

it is expected that this will reduce the marketing risks for farmers and, hence, increase their incomes.

The buyer non-compliance variable counts how many of the same 15 attributes have been violated by the buyers. It is, therefore, expected that such non-compliance will act in the opposite direction to contract coverage and increase the risks for farmers. Note, that if the analysis was looking at whether contracts had an effect on agricultural incomes, such an effect would have been a combination of the above two variables, i.e. an interaction of the assumed positive effect of contract coverage and the negative impact of buyer non-compliance. Since these two variables are still quite aggregate measures that ignore much of the heterogeneity of the underlying contracting arrangement, and as counting measures implicitly assume that all the underlying elements are equally important, which might not be the case, the paper does not claim to investigate the effect of contracting itself. Instead, the focus is on the two specific aspects of contracting that these two variables capture.

Finally, the ease to change a buyer is a 5-point scale evaluation by the respondents which proxies one aspect of their market access opportunities. Greater ease, and hence better market opportunities, is expected to benefit farm growth and farming incomes. This particular variable measures the underlying market opportunities from a farmer's point of view.

The summary statistics of variables used are presented in Table 2.

Empirical methodology

If, as pointed by Kostov *et al.* (2021), the direct payments affect agricultural incomes and this creates an endogeneity issue which needs to be accounted for. For this reason, direct payments could be considered in a conventional endogenous estimation framework. The standard approach to endogeneity involves instruments. In order for instrumental estimation to be reliable, it needs to meet a number of assumptions, as well as to identify all potential sources of endogeneity. If (but only if) all these assumptions are met, the instrumental estimation can identify the model. This means that identifying appropriate instruments is a challenging task.

For this reason, we adopt the copula identification methodology of Park and Gupta (2012), which corrects for the correlation between the endogenous variable(s) and the error terms by using a copula specification to model the latter. Hence, instead of assuming what defines the exogenous variation of the endogenous variable(s) this method (implicitly) models the endogenous variation. We have implemented the 'control function' approach which provides additional validity checks with regard to the validity of the correction terms. The validity of this estimation approach requires some preconditions, such as heteroscedasticity and non-normality in the endogenous variable(s). Recently Eckert and Hohberger (2023) presented a detailed simulation-based comparison of the performance of the copula approach vs instrumental variables and some other instruments-free approaches to endogeneity. The two most serious challenges to the copula approach appear to be the poor copula approximation and non-Gaussian innovations. Both these are, however, instances of general model misspecification and as such are commonly applicable to all alternative approaches as well. The validity of the copula approach requires non-Gaussianity of the endogenous variable, in this case the direct payments, which has been tested. Given the heavily tailed distribution

Table 3: Specification tests.

Normality tests		
	Test Statistic	P-Value
Shapiro-Wilk test	0.95	0.00
Kolmogorov-Smirnov test	0.93	0.00
Copula goodness of fit tests for median model		
	Test Statistic	P-Value
White Test	41.11	0.52
Cramer-von Mises Test	0.69	0.32
Kolmogorov-Smirnov Test	1.88	0.51

Source: Own calculations

of Kosovo farm incomes and by implication of the disbursed direct payments this is hardly surprising. Furthermore, the copula approximation can be tested via general misspecification tests. Results from normality tests for the direct payments alongside with a battery of copula specifications tests at the median are provided in Table 3. Further specification tests are available from the authors upon request.

The central issue in this paper, as stated previously, is to investigate who benefits most from policy interventions and marketing arrangements. This requires us to estimate and contrast potentially different effects on different farm income groups. To do this we employ unconditional quantile regression, commonly referred to as re-centred influence function (RIF) regression (although the latter term is more general), and follow Firpo *et al.* (2009). It consists of estimating the RIF of the quantiles which is $q_\tau + (\tau - 1(Y \leq q_\tau))/f_Y(q_\tau)$ where $1(.)$ is the indicator function, $f_Y(.)$ is the density function of the dependent variable Y and q_τ is its unconditional τ-quantile. As long as the density function is given, and it can be estimated by standard kernel methods, the above quantity is simple to calculate. Then it can be regressed on a set of covariates in order to obtain the unconditional partial effects of the covariates, which in the case of linear specification are simply the estimated linear coefficients. Although any unconditional quantile is essentially a scalar, and can be directly estimated from the sample, the unconditional quantile regression effects are recovered via a regression of the RIF of the quantile of interest on the full set of covariates and, therefore, use the full sample irrespective of which unconditional quantile is being estimated.

Furthermore, in this paper the results are compared to a conventional mean regression. Such a comparison would be useful in deducing some potential issues with the mainstream approach to analysing the effects of policy support. To this end, it is important to reinterpret the mean regression with regard to its quantile counterparts. In order to achieve this, and in accordance with the empirical approach adopted in the study, a linear functional specification for both mean and quantile models is assumed. While quantile regression models estimate each quantile separately and hence allow for different effect across the distribution of the dependent variable, the mean regression assumes that these effects do not change along the distribution of the outcome variable.

Discussion of results

Five different quantile regressions for a range of different quantiles have been estimated. The aim was to provide a reliable coverage of agricultural income distribution by using a relatively small number of quantiles to allow for a tabular representation of results. For this purpose, the quartiles of the distribution were used and complemented by two tail quantiles - the 0.1^{th} and the 0.9^{th}. The consideration not to go deeper into the tails has been to avoid analysing less typical in terms of farming income quantiles.

The results from the estimations, alongside the results from a conventional mean regression are presented in Table 4. In order to make these results comparable, some simplifications have been made. First, the OLS approach to the RIF regression estimator has been adopted. This is more innocuous than it may appear since the alternative estimation methods suggested in Firpo *et al*. (2009) produce very similar results. For inferential purposes, 1000 bootstrap replications to derive approximate P-values were used. The Bayesian bootstrap (Rubin, 1981) was employed instead of the conventional one (Efron and Tibshirani, 1986). We chose this due to the better coverage capabilities of the Bayesian bootstrap. Region-clustered standard errors were used for both the unconditional quantile regressions and the mean model. Furthermore, for simplicity, we omit the intercept terms as well as the corresponding copula correction terms which are all highly significant. The full results are available upon request.

The results indicate a considerable variation of the effects across the different quantiles, suggesting significant

Table 4: Estimation results.

	Mean regression		0.1^{th} quantile		0.25^{th} quantile		0.5^{th} quantile		0.75^{th} quantile		0.9^{th} quantile	
	9586	1.00	800	0.08	1500	0.16	4000	0.42	10000	1.04	20000	2.09
	Coefficient	P Value	Coefficient	P Value	Coefficient	P Value	Coefficient	P Value	Coefficient	P Value	Coefficient	P Value
Non-agricultural Income	0.0737	0.00	0.0034	0.00	0.0059	0.00	0.0142	0.00	0.0344	0.00	0.1705	0.07
Investments	0.0382	0.01	–0.0009	0.44	0.0015	0.00	0.0073	0.00	0.0167	0.00	0.1202	0.00
Investment Subsidies	0.0671	0.03	0.0068	0.02	0.0064	0.02	0.0159	0.00	0.0456	0.00	–0.0688	0.18
DP	1.8780	0.00	0.9347	0.00	0.9037	0.00	0.8616	0.00	–0.3446	0.06	2.7328	0.09
Age	–56.7400	0.30	–24.4683	0.00	–23.5128	0.00	–54.7975	0.00	–147.8439	0.00	–239.4498	0.04
Gender	–264.0000	0.91	355.4638	0.00	–419.3589	0.00	–1,369.0975	0.00	529.9393	0.44	–9,845.1204	0.01
Education	–1,278.0000	0.25	–23.0884	0.70	–454.8160	0.00	–918.8298	0.00	–219.2078	0.08	402.3503	0.72
Contract coverage	92.5900	0.63	16.1682	0.05	37.2901	0.00	59.2868	0.00	109.0672	0.00	862.5450	0.01
Buyer noncompliance	–496.3000	0.03	–121.0463	0.00	–91.3480	0.01	–242.7347	0.00	–416.7148	0.00	–1,311.9843	0.02
Ease to change buyer	1,854.0000	0.01	113.9904	0.02	279.1203	0.00	684.1134	0.00	2,969.2915	0.00	3,893.8593	0.01

Source: Own calculations

heterogeneity in the effects of the covariates on agricultural incomes. The effects are significant across most quantiles (Table 4). There are a few exceptions of statistically insignificant coefficients, i.e. the effect of education in both tails, the effect of investments for low-income farms and investment subsidies for the high-income farms, but overall, the model explains agricultural income across its distribution. This contrasts with the mean model where the three background variables (age, gender, education) and the contract coverage are all insignificant. Qualitatively then the reliance on the mean model would be unsatisfactory.

In more detail, the estimated effects show that non-agricultural income increases agricultural income. Such an effect is to be expected. First, non-agricultural incomes can be used either directly or indirectly for investment purposes since they facilitate access to credit. Second, higher incomes can create a wealth effect and reduce risk aversion, hence, leading to a higher degree of innovative entrepreneurial behaviour which could benefit agricultural incomes. Investments, as expected, increase agricultural incomes, although there does not appear to be a discernible effect at the lower tail. Taking into account that at the 0.1^{th} quantile farm income is only 800 euros, it is likely that such an entity would not implement purely commercial logic. Direct payments have an income enhancing effect. Age is found to reduce income, even though the average age in the sample is quite low, i.e. 48 years (see Table 2). The gender effects, although formally significant, appear to be highly unstable and switch signs over the different quantiles. Given that the reference group (female) only accounts for 11 per cent of the observations, it is difficult to estimate reliably such effects for specific quantiles and, hence, the results need to be taken with caution. More comprehensive contracting in terms of higher contract coverage and better marketing opportunities, measured by the ease with which buyers can be replaced increase agricultural incomes, while the buyers' non-compliance with the contract terms, as expected, reduces incomes.

The different coefficients for the same covariate, as presented in Table 4, cannot be compared directly. To be made comparable, all unconditional quantile regression coefficients have to be transformed in similar relative terms. In order to include the mean regression in such comparison, we have standardised by multiplying the coefficients at each quantile τ by μ/q_τ, where μ and q_τ are correspondingly the mean and the unconditional τ – quantile of the dependent variable (agricultural income). The logic of this standardisation is as follows. Let us consider the effect of any explanatory variable at some quantile τ and denote this effect as c_τ. This is the effect estimated and reported in Table 4. Then $c_\tau./\ q_\tau$ will represent the (relative) effect of this variable per unit (1 euro) of farm income. Then if we multiply this by the mean value of the farm income we will obtain the effect at the above quantile q_τ expressed in terms of the mean income as: $c_\tau * (\mu/q_\tau)$. This 'standardised' effect would then be directly comparable to the effect estimated from a mean regression since the latter is already expressed at mean income levels.

These transformed results are presented in Table 5. The inverse values of the ratios q_τ/μ. are presented in the upper part of Table 5, next to the values of q_τ. If all quantile coefficients from Table 4 are divided by these ratios, comparable effects across quantiles are obtained, which could also be compared to the mean regression coefficients. The logic behind the proposed standardisation is that the division of estimated effects by the value of the corresponding unconditional quantile transforms the coefficients into effects per unit of the dependent variable, in this particular case a Euro of agricul-

Table 5: Standardised estimation results.

	Mean regression		0.1^{th} quantile		0.25^{th} quantile		0.5^{th} quantile		0.75^{th} quantile		0.9^{th} quantile	
	Agricultural Income	Ratio to mean income	Agricultural Income	Ratio to mean income	Agricultural Income	Ratio to mean income	Agricultural Income	Ratio to mean income	Agricultural Income	Ratio to mean income	Agricultural Income	Ratio to mean income
	9586	1.00	800	0.08	1500	0.16	4000	0.42	10000	1.04	20000	2.09
	Coefficient	P Value	Coefficient	P Value	Coefficient	P Value	Coefficient	P Value	Coefficient	P Value	Coefficient	P Value
Non-agricultural Income	0.0737	0.00	0.0411	0.00	0.0374	0.00	0.0341	0.00	0.0330	0.00	0.0817	0.07
Investments	0.0382	0.01	–0.0106	0.44	0.0093	0.00	0.0175	0.00	0.0160	0.00	0.0576	0.00
Investment Subsidies	0.0671	0.03	0.0809	0.02	0.0408	0.02	0.0382	0.00	0.0437	0.00	–0.0330	0.18
DP	1.8780	0.00	11.2005	0.00	5.7751	0.00	2.0647	0.00	–0.3304	0.06	1.3098	0.09
Age	–56.7400	0.30	–293.1912	0.00	–150.2623	0.00	–131.3222	0.00	–141.7232	0.00	–114.7683	0.04
Gender	–264.0000	0.91	4,259.3448	0.00	–2,679.9827	0.00	–3,281.0421	0.00	507.9998	0.44	–4,718.7662	0.01
Education	–1,278.0000	0.25	–276.6566	0.70	–2,906.5773	0.00	–2,201.9755	0.00	–210.1326	0.08	192.8465	0.72
Contract coverage	92.5900	0.63	193.7351	0.05	238.3089	0.00	142.0808	0.00	104.5518	0.00	413.4178	0.01
Buyer non-compliance	–496.3000	0.03	–1,450.4379	0.00	–583.7745	0.01	–581.7137	0.00	–399.4628	0.00	–628.8341	0.02
Ease to change buyer	1,854.0000	0.01	1,365.8902	0.02	1,783.7649	0.00	1,639.4778	0.00	2,846.3628	0.00	1,866.3268	0.01

Source: Own calculations

tural income, which means that all transformed quantile coefficients become comparable.

The standardised coefficients are presented in Table 5 which, as explained, can be used to directly compare the effects across the quantiles and to the mean regression. This particular presentation is designed with regard to the question of the present paper. More specifically, the interest is in the effect of payments and marketing environment on different income group farms in order to reveal which income group benefits most. Therefore, the focus is on a comparative perspective.

Note, furthermore, that due to the highly skewed and leptokurtotic nature of the agricultural income distribution the mean should not be compared to the median. In fact, out of the five quantiles considered in this paper it is the third quartile where the agricultural income is closest to the mean agricultural income. This means that the mean regression is implicitly biased towards larger farms, while most of the farms in the sample, and in Kosovo in general, are much smaller. Therefore, any results from a mean regression are unrepresentative of Kosovo agriculture.

Investment subsidies exercise the strongest relative income effects in the lower tail (the 0.1^{th} quantile), and these effects are not significant in the upper tail. Furthermore, since even the unstandardised coefficient of investment subsidies (i.e. the one from Table 4) is larger at the lower tail quantile, this indicates that they are more effective in generating income when provided to the lower income farmers. This implies that investment programmes aimed at lower income farms might be justified, both in terms of distributional effects but also in term of subsidies 'value for money'.

The transformed effects in Table 5 reflect the relative effects of different variables for different farms according to their agricultural income. Larger numbers denote that these effects are more important in relative terms for the farms concerned since they have greater impact on their income. The corresponding relative effect of direct payments is slightly larger in the lower tail and significantly greater in the upper tail. One would need to take this comparison with some caution due to the larger standard error associated with the point estimates. For example, looking at Table 4, although the point estimates fall in the middle of the distribution and increase dramatically in the upper tail, if we looked at whether the 95% confidence intervals for any of these include 1 (which corresponds to no leakages from the direct payments), it is only the 0.75^{th} quantile for which this is not the case.

There is a substantial body of literature of the leakage of direct payment and other coupled support, which may suggest that coefficients close to (and mostly not statistically significant from) one may appear a bit strange. However, given the largely universal nature of the Kosovo direct payments implementation, this is not so surprising. In many cases, farmers do not need to change production decisions to obtain such payments. And yet if this was the case for all farms, there would have been no endogeneity issue. The wide confidence intervals are partially due to the general nature of the endogeneity correction applied in the present paper. Yet, although increasing the efficiency of the estimates may result in point estimates for the effect of direct payments that are significantly different from one (if e.g. valid instrumentation helps shrink the corresponding standard errors), the comparative between different quantiles nature of the results will remain. And this comparison indicates that farmers at the two ends of the income distribution, i.e. those with low and those with high income, make less production adjustments in order to obtain direct payments. It is the farms in the middle of the income distribution which tune their production decisions accordingly to the provision of direct payment. Based on these results we argue that the direct payments preserve the production sets for the lower and higher income farms and, hence, maintain the current dualistic nature of Kosovo farms' structure.

It is also clear that the mean model grossly overestimates this effect. Looking at the relative effects in Table 5, the greater effect in the lower tail means that poorer farmers do indeed benefit more in relative terms than the typical farms. However, the farms in the middle of the income distribution appear to be disadvantaged. Hence, direct payments harm the middle of the farming incomes distribution. They compress the lower part of the income distribution towards the middle by increasing the relative incomes at the bottom more than those in the middle, thus reducing these differences. The greater effect at the top of the income distribution, on the other hand, increases the difference between the middle- and high-income farms. Therefore, direct payments reduce income inequality in the lower part of the income distribution, but increase it in the upper part since the richest farms pull away from the middle.

A quick glance of the direct payment effects, presented in Table 4, shows that they have greater income effect for larger in income terms farms (although due to the large standard errors this needs to be taken with some caution). If the objective of Kosovo support policy through direct payments were to achieve the highest income generation in absolute terms, they had to allocate them to largest farms. This, however, would result in increased income inequality.

Hence, agricultural support policy in Kosovo faces a dilemma – if it needs to maximise 'value for money', i.e. to maximise the farm income generated by direct payments, the latter should be aimed at higher income farms. If, however, the policy objective is to support meagre incomes of income poor farmers and their livelihoods, payments will generate stronger effect if targeted at lower income farms (see Table 5).

The age of the farm owner (head of household) is most constraining for low-income farms. Education has a negative effect (but not in the tails). This may appear counter-intuitive, but it is worth recalling that the ordinal measure of education used in this paper is a rather imperfect indicator. Presumably, some measure of agricultural, rather than general education would have been more appropriate.

Contract coverage is most important in the upper tail, which confirms the *a priori* expectation deduced from conceptual framework. The second most affected group by contract coverage are the farms in the lower quartile, with weaker relative effects in the middle of the distribution. Greater detail on what is agreed regarding selling the output would clearly benefit farmers with the higher income having better capability to meet such requirements and extract additional income. It is worth noting that the mean model underestimates the importance of contract coverage.

Buyer non-compliance is most damaging to the lower income farms, something that is consistent with our conceptual framework. Since contract coverage and buyer non-compliance measure essentially the same thing and are constructed on the same scale, an informal way to examine the effect of fully enforceable contracting could be by subtracting the coefficient of buyer non-compliance from that of contract coverage. If we were to do so, the aggregate effect of contracting would be the largest for the low-income farms. To put this into perspective, due to different power dynamics buyers would find it easier to violate contracting terms when dealing with smaller farms, reducing the potential contracting benefits in the lower tail of the farm income distribution.

Concerning the ease with which a farm may change a buyer, it is the least influential consideration for the lowest income farms, with the other farms broadly at par with the exception of the third quartile where it peaks. Once again this can be related to market power dynamics, with smaller lower income farms not being able to take advantage of market opportunities to the same extent as their more affluent counterparts.

The results show that the lower income farmers are penalised by their low market power, thus, they are unable to negotiate better-defined contracts and enforce contractual arrangements. Therefore, improvements in the marketing conditions and environment would be most beneficial to the incomes of smaller farmers and in budgetary terms cheaper than direct payments allocated to tens of thousands small farmers. The measures that are most effective in improving the incomes of the small lower income farmers that dominate Kosovo agriculture relate to improving contract enforcement (reducing buyer non-compliance) and improving marketing opportunities measured in our data by the ease to change a buyer). Hence marketing and contracting arrangements are to be the focus of agricultural policies if a more equitable farming income distribution is required or if indeed, given the prevalence of small income-poor farms in Kosovo agriculture, supporting farming income is the primary aim of such policies.

Conclusions and policy implications

Despite being one of the poorest countries in Europe, Kosovo dedicates a substantial budget to agricultural support, and the largest part of this budget is allocated to direct payments. The paper investigates how this support and marketing environment affect farms in different quantiles of the agricultural income distribution and whether they help closing the income gap.

Analysis indicated that direct payments have several unwanted consequences. They penalise the middle-income farmers which might be a group with the potential to grow and improve their livelihoods. Direct payments maintain the dualistic structure of Kosovo agriculture since high- (according to Kosovo standards) and low-income farms have to make the least production adjustments to get direct payments. Direct payments increase income inequality, pushing the high-income group away from the middle. In general, they have the strongest effect on the highest income farmers. Therefore, it is necessary for Kosovo to clarify the objective of these direct payments. If the objective is to achieve the highest income generation in absolute terms, then their focus should be the high-income farm; some minimum size threshold may also be needed to avoid provision to small scale farms where they are less effective. But if, on the other hand, the objective is to decrease income inequality and to get low-income farmers out of poverty, then direct payments are counter-productive. Overall, direct payments are not an appropriate measure to support a more equal distribution of farmers' incomes. Given that Kosovo agriculture is dominated by small size lower income farms, direct payments will fail to sufficiently raise their incomes.

This suggests that it may be preferable to increase the eligibility requirements and to focus on larger farms, but to introduce other measures that are more effective and efficient to support the incomes of poorer farmers. One such measure, suggested by our analysis, is investment subsidies. They represent better value for money when provided to the lower income farms, since they can generate more income in absolute terms compared to a case when they are aimed at better-off farmers. Therefore, investment subsidies targeted at lower income farms might be an effective measure to decrease the income gap. In this context targeting may mean earmarking investment subsidies funds specifically for small-scale farms and hence implementing maximum size requirements for such subsidies. This does not mean cutting off larger farms from such subsidies but rather separating investment support for smaller and larger farms possibly with different requirements and goals. Even a more targeted implementation such a linking eligibility to estimated (by e.g. business plans) income and/or production increases would be possible. There is of course a balance to be found since more extensive targeting implies stricter requirements which increase the cost of administering such policies.

The paper emphasises the importance of farmers' contracts with downstream buyers for farm incomes and, in particular, the role of the content of the contract and the marketing opportunities. More complete contracts in terms of the number of items determining the terms of the contract and better marketing opportunities, proxied by the ease with which farmers can replace the buyers, increase agricultural incomes, whilst the buyers' non-compliance with the contract conditions is detrimental to farmers' income. However, in a manner similar to the policy support payment, the effect of marketing opportunities on different farm income groups is differentiated. Higher income farmers benefit more from the better contracts' coverage. In a sense, the effect of contract coverage resembles that of direct payments concerning the income gap between poorer and better-off farmers. What appears to be most important for the poorest farmers is the extent to which buyers respect the contracting terms. Ensuring contract enforcement has the potential to reduce income inequality by providing greater support for lower income farms but this requires an effective legal framework and concerted efforts on the part of policymakers in Kosovo. Nevertheless, the cost of improving contract enforcement is much lower than the expensive direct payments and as such,

the current preoccupation of agricultural support in Kosovo with direct payment may be misplaced.

Overall, it appears that the current Kosovo agricultural support is not well-targeted towards clearly defined policy objectives – a greater increase in farm incomes versus reduced income inequality. No such objectives are stated in justifying policy instruments, and they cannot be inferred from the analysis of the effects of the present mix of policy instruments. Policy tries to achieve everything, applying blanket measures which are consequently less effective. Taking into account the significant effect of contract farming, appropriate interventions are necessary at different stages of the supply chain and should not be limited to production. Currently, however, Kosovo's attempt to emulate the EU Common Agricultural Policy (CAP) may be premature; the CAP is designed for economies with mature marketing systems and robust institutional frameworks for contract enforcement.

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