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# The impact of government subsidies on the olive and vineyard sectors of Albanian agriculture

This study analyses the impact of government subsidy schemes on farm production capacity, technical efficiency and use of idle production factors (land and labour) in the olive and vineyard sectors of Albanian agriculture. The paper uses a quasi-experimental design by applying a propensity score matching method based on a structured survey conducted in 2013. The results show that the government subsidy scheme had a net positive impact on areas planted with olives and grapevines, and on part-time on-farm employment. On the other hand, no significant net impact was observed regarding farm size and crop yields. This is the first time that such an in-depth impact assessment of government subsidies in the agriculture sector has been carried out in Albania, thus the results will be useful both for scientists and policy makers in agriculture and rural development.

**Keywords:** agricultural subsidies, impact assessment, propensity score matching

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## Introduction

Analysing subsidies has always been an issue of debate in agricultural economics. On the one hand, subsidies provide incentives to enable changes that cannot otherwise happen. On the other hand, agricultural economists are sceptical regarding the effectiveness of agricultural subsidies, often considering them too expensive, poorly targeted, distortive and path dependent (Baltzer and Hansen, 2011).

Although agricultural policy programmes are hard to evaluate for several reasons (e.g. conflicting objectives, lack of clear goals, indirect effects, political interests etc.), many empirical studies have analysed the effects of agricultural policies on farm structures (Ahearn *et al*., 2005; Kim *et al*., 2005; Feichtinger and Salhofer; 2013). Despite the obvious importance of the topic in agricultural policy making, Ahearn *et al*. (2005) conclude that "our understanding of how government policies have affected the structure of agriculture, or how future policies could be designed to promote specific outcomes, remains limited" (p.1182).

In line with the diversity of agricultural policy programmes, empirical studies analysed different aspects of government subsidies in agriculture. Baltzer and Hansen (2011), for instance, analysed large scale *input* subsidy programmes in Sub-Saharan Africa and concluded that the popularity of these subsidies is mainly due to their political attractiveness rather than economic superiority. Banful (2011) went further, suggesting that political powers 'watered down' the effectiveness of fertiliser subsidy programmes in Ghana. By contrast, Huang *et al*. (2011), analysing the impact of China's agricultural subsidies, found that input subsidies appear to be non-distorting in terms of producer decisions.

Rada and Valdes (2012) showed that the benefits of agricultural research have been most rapidly adopted by the most efficient farms, while other public policies including rural credit and infrastructure investments, favoured 'average' producers. Minviel and Latruffe (2014) found that targeted investment subsidies were positively associated with farm's technical efficiency, while Bojnec and Latruffe (2013) found that agricultural subsidies reduced the technical efficiency of Slovenian farms but improved their profitability. Zhu and Lansink (2010) analysed the impact of European Union (EU) Common Agricultural Policy (CAP) subsidies on the technical efficiency of crop farms in selected EU Member States and also found mixed results.

Ciaian and Swinnen (2006) analysed the *welfare effects* of agricultural subsidies in the ten Member States that joined the EU in 2004 by analysing their land markets and found land-related payments ineffective and distortive. In an overview on the influence of agricultural support on agricultural land prices, Feichtinger and Salhofer (2013) concluded that a considerable share of farm subsidies were absorbed by the land owners rather than by the operating farmers.

Kaditi (2013) analysed the impact of the CAP reforms on *farm labour structure* in Greece and found that agricultural support measures negatively affected demand for both family and hired labour. The paper also found that structural labour adjustments were the result of farm characteristics such as farm size and location. In their analysis of the effects of the 2003 reform of the CAP on Irish farmers' off-farm labour market decisions, Hennessy and Rehman (2008) found that decoupling of direct payments was likely to increase the probability of farmers participating in the off-farm employment market and that the amount of time allocated to off-farm work would increase.

Brady *et al*. (2009) analysed the impact of decoupled direct payments on *biodiversity* and landscape and found that eliminating the link between support payments and production had only limited negative consequences for the landscape. They suggested that these effects could be offset by strengthening (CAP Pillar II) agri-environmental schemes. Mayrand *et al*. (2003), investigating the environmental impacts of U.S. agricultural subsidy programmes, showed that higher subsidies had led to an intensification of agricultural production which is detrimental to environmental sustainability. In addition, they concluded that in most countries agricultural support remained largely concentrated on market price support and output/input-based payments, which are the most environmentally harmful categories of subsidies. Harvey and Hubbard's (2013) analysis of the political economy of animal welfare programmes found them to be inefficient. The authors suggested that conventional arguments for government interventions are misleading.

There is considerable criticism of the present policy systems, especially the major ones such as the CAP and the U.S. Farm Bill. Most authors find that most current agricultural subsidies are inefficient and out-dated, though there is no consensus how to reform them (see e.g. Chau and de Gorter, 2005; Harvey and Jambor, 2011; Tangermann, 2011).

Overall, the empirical findings are rather mixed. On the one hand, agricultural policy programmes have succeeded in raising farmers' use of inputs, productivity and incomes. On the other hand, they have been extremely expensive. Subsidies have tended to benefit those who are relatively well off and farmers have become dependent on continued government support.

In the above context, this article analyses the impact of Albanian agricultural subsidies on farm development and decision making. It adds to the existing literature in three ways: (a) it uses an up-to-date survey dataset; (b) it tests the effectiveness of agricultural subsidies in one country; and (c) it analyses agricultural subsidies in a country aiming to join the EU. To the best of our knowledge, it is the first time that such an in-depth analysis has been carried out for Albania.

This study focuses on the olive and vineyard sectors which are among the most important and fastest growing agri-food sectors in Albania. Olive production has increased significantly in recent years, from 27,600 tonnes in 2007 to about 100,000 tonnes in 2012. Since then, there has been a marked expansion of plantings stimulated by national support schemes and the number of olive tree production areas has increased by approximately 60 per cent. Grape production has also increased significantly, by almost one third compared to 2007 (MARDWA, 2014). Both sectors have absorbed significant government subsidies – they were the most important sectors that were targeted by the first subsidy support measures.

### Hypotheses

Based the foregoing, the following hypotheses are advanced:

1. *Government subsidy has a positive impact on production capacity.* Standard microeconomic theory suggests that reduction in investment costs will lead to increased production capacity. Stiglitz's (1987) argument of subsidy 'incentive' supports the idea that subsidies in agriculture inevitably influence the behaviour to allocate effort and other resources to agriculture. Whereas 'early' agricultural programmes tend to encourage agricultural production growth, recent versions tend to decouple support from production levels (Anderson *et al.*, 2013; Anderson and Valenzuela, 2013). In this respect, we assume Albania's agricultural policy to be at the 'early' stage.
2. *Government subsidy will result in improved technical efficiency.* According to the empirical literature, the impact of subsidy on technical efficiency – output maximisation for unit of input – is rather mixed (Zhu and Lansink, 2010; Rada and Valdes, 2012; Bojnec and Latruffe, 2013; Minviel and Latruffe, 2014). Our results can contribute to the inconclusive debate on the impact of subsidy on technical efficiency.
3. *Government subsidy encourages land and labour use.* One of the justifications of trade protection for developing countries is that higher domestic prices will lead to an upward movement of the production possibility frontier as a result of bringing idle resources, namely land and labour, into the economic cycle. This is actually a 'second best' policy that solves the problem indirectly (Krugman and Obstfeld, 1994). Though investment subsidy is also a 'second best' policy (government supports farmers to increase the area planted without intervening directly in the land and labour market), it is closer to the 'problem source' and is therefore expected to motivate farmers to use idle resources. Furthermore, in Albania, a large share of agriculture land has not been subject to formal property registration (Zhllima and Imami, 2012), which makes access to finance and loan very difficult (lack of collateral). Thus, (in addition to loan guarantees) subsidies can be an important way of enabling such farmers to fund investments, which in turn can allow the use of idle land and labour as well as contribute to an increase in production capacity (hypothesis 1).

## Methodology

### Propensity score matching procedure

Quasi-experimental design using a propensity score matching (PSM) method was used to create two similar groups from a randomly-selected sample, one composed of subsidised farmers (treated group) and another composed of non-subsidised farmers (control group).

Conceptually, PSM is based on the counterfactual approach. From a pool of treated and control group subjects, PSM permits observations on treated subjects that are (on average) similar to the control group subjects on as many criteria as possible with the exception of the treatment itself. Following the work of Rosenbaum and Rubin (1983, 1985), Rubin and Thomas (1996), Sekhon (2011), and Ho *et al.* (2011), PSM has become an increasingly popular approach to estimate causal effects in impact evaluation.

PSM is a three-stage process. The *first stage* entails estimating the propensity score, which is the probability of receiving treatment conditional upon observed independent variables or covariates. This probability is found by regressing membership in the treated versus control group (dependent variable) on a set of observed independent (covariates or predictors) variables by means of a logit or probit regression.

In the propensity score procedure using logit regression, our dependent variable was 'S_2008', which is a dummy/binary variable taking the value 1 for farmers who have received government subsidy in 2008 and 0 for the ones not having received subsidy during the same year. The independent variables or covariates that were used to regress the membership to treatment versus control group are described in Table 1.

**Table 1:** Independent variables or covariates used in the logistic regression.

| Variable | Type | Unit of measurement |
|---|---|---|
| Age of household head (HH) | Scale | Years |
| No. of family members working on the farm | Scale | Persons |
| Educational level of household head | Ordinal | 1=no education;<br>2=elementary school (four years);<br>3=mandatory school (nine years);<br>4=agricultural high school;<br>5=general / technical high school;<br>6=university |
| Farm size in 2008 | Scale | Dynyms* |
| Experience of HH head in the chosen activity | Scale | Years |
| Type of employment | Dummy | 1=farming as main employment, 0=other employment as main employment |
| Sector dummy | Dummy | 1=vineyard; 0=olives |
| County (qark**) | Dummy | 1=Fier; 0=Shkodër |

* One dynym is equal to 1000 $m^2$
** A qark is a local government unit in charge of regional planning and development.
Source: own composition

The nearest neighbour matching procedure of MatchIt software (Ho *et al*., 2011), an R package was used to create two similar groups. Several matching procedures were run (simple matching, matching using 'caliper' 0.25[1], matching without caliper with replacement in control groups at ratio 2 (allowing matching of one control member for two treatment group members), and matching with replacement and caliper 0.25) before choosing the second as the one which better balances treated and control group.

*The second stage* is matching the treated subjects to the control subjects in such a way that the two groups are similar for all covariates represented by the propensity score measure. In general this entails matching treated with control individuals using similar propensity scores. Various algorithms are available for the matching procedure, including nearest neighbour matching with replacement and without replacement (one treated case for one control case), radius matching, kernel matching, stratification matching and others.

An important tool to assess whether covariate balance has been achieved is the standardised absolute bias, which is calculated as absolute bias:

$$Absolute\ bias = \frac{\bar{X}_{treated} - \bar{X}_{control}}{\sqrt{\frac{S^2_{treated} + S^2_{control}}{2}}} \qquad (1)$$

where $\bar{X}_{treated}$ and $\bar{X}_{control}$ are the means of a given covariate for the treated and the control subject, respectively. Likewise, $S^2_{treated}$ and $S^2_{control}$ are the respective standard deviations of the given covariate. Rosenbaum and Rubin (1985) have suggested that differences greater than 20 per cent should be regarded as unacceptable.

Two groups of 100 farmers – each one treated and one control – were formed by matching the propensity scores. The remaining 56 farmers, nine subsidised and 47 non-subsidised, were excluded from the analysis. Table 2 summarises the similarity of treated and control groups before and after matching.

[1] Caliper, the allowed difference in propensity score, is expressed in standard deviations of average propensity scores.

**Table 2:** Statistics for the similarity of treated and control groups of farmers before and after using the *m.out_caliper 0.25* matching procedure.

| | Before matching | After matching |
|---|---|---|
| Number of observations | 256 | 200 |
| Mean absolute bias | 0.08 | 0.03 |
| Maximum absolute bias | 0.29 | 0.12 |
| N variables with absolute bias >0.15 | 2 | 0 |
| Mean difference significant at p<0.05 | 0 | 0 |

Source: own calculations

**Table 3:** Dependent and independent variables used to measure net treatment effect.

| Concept | Dependent variable | Independent variable | Unit of measurement |
|---|---|---|---|
| Government subsidy | - | Subsidy in 2008 | Dummy variable, taking the value 1 for treated farmers and 0 for control farmers |
| Production capacity | Area under olives and vineyards (2012) | Area under olives and vineyards (2008) | Dynyms |
| Technical efficiency | Yield per hectare (2012) | Yield per hectare (2008) | Tonnes |
| Farm size | Area per farm (2012) | Area per farm (2008) | Dynyms |
| Part-time on-farm employment | Part-time farmers (2012) | Part-time farmers (2008) | Number of farmers |

Source: own composition

Members of the two groups of 100 farmers are similar in terms of average age of household head (55.5 years for the control group cf. 56.5 for the treatment group). Although the number of family members working on the farm is slightly higher for the control group (2.35) than for the treated group (2.30), the difference is not statistically significant. Similarity is also observed in terms of education – the median value for both groups is 4 (corresponding to agriculture high school) and the distribution through the different education levels is similar. The average farm size around 15 dynym for both groups. The experience in farming is slightly lower for the control group (26.7 years) than for the treated group (29.5 years) but the difference is statistically not significant. The groups are also similar in terms of main employment with on-farm self-employment being the most frequent main employment. In terms of sectors, 109 farmers are olive farmers and 91 farmers are vineyard farmers. The allocation of farmers by qark is equal for both the control and treated groups.

The *third stage* entails measuring the net treatment effect. We do so by running simple linear regressions to find out whether the subsidy has had any statically significant impact (Oakes and Feldman, 2001; Onur, 2006) on the considered outcomes. The linear regression takes the form:

$$Y = \alpha + b_1 X + b_2 T + \varepsilon \qquad (2)$$

where $Y$ is the post-score of an outcome variable, α is the estimated intercept, $X$ is the pre-test score of the same variable, and $T$ is a dummy variable taking value 1 for treatment and 0 for control group. The $b_2$ coefficient associated with $T$ (Treatment) provides a measure of net treatment effect.

Four regressions were run to measure net treatment effects of government subsidy on production capacity, technical efficiency, farm size and part-time on-farm employment. The dependent variables are represented by data for 2012 while the independent variables are represented by subsidy in 2008 and data for 2008 (Table 3).

### Data

A face-to-face survey of 119 vineyard farmers and 137 olive farmers was conducted in 2013 using a structured questionnaire that was tested and accordingly adjusted before being used for data collection. For practical reasons, our analysis was confined to two counties (Shkodër and Fier) out of 12 that made up Albania at that time. The sectors and areas were selected on the basis of three criteria: (a) amount of government subsidy – Shkodra and Fier have both received significant financial support for establishing olives and vineyards, and the money allocated to these sectors in these counties has been substantial – that to olives has been more than half (55 per cent) of all such funding in Fier and slightly less than one third (32 per cent) in Shkodër; (b) sector potential to reveal at least some impact in the four years from 2008 to 2012; and (c) regional representativeness, considering counties from both southern (Fier) and northern (Shkodër) Albania.

Communes and village selection was based on frequency of supported beneficiaries using the information provided by the Ministry of Agriculture, Food and Consumer Protection (MAFCP). Beneficiaries (subsidised farmers) were selected randomly based on lists provided by the Regional Department of Agriculture (extension service) while non-beneficiaries (non-subsidised farmers) were identified using a quasi-random selection, following a random route procedure. Interviews were conducted by well-trained postgraduate students of the Agricultural University of Tiranë. Their work was facilitated by MAFCP staff (extension experts). The research team technically supervised the whole process, including the survey implementation.

## Results

In this section, hypothesis 1 (effect of government subsidy on production capacity) is operationalised as area planted with olives and vineyards, hypothesis 2 (effect on technical efficiency) as olive and vineyard yields per hectare, and hypothesis 3 (effects on land and labour use) as farm size and on-farm employment.

### Government subsidy and area planted with olives and vineyards

Government subsidy has had a clear, positive impact on the area planted with olives and vineyards. The net treatment effect of subsidy is 4.39 dynyms (Table 4); this difference is statistically significant as informed by t statistic and related p-value associated with Subsidy_2008.

In 2008 the average planted area per farm, 2.5 dynyms for subsidised farmers and 3.2 for the non-subsidised farmers, was rather similar for the two groups. The subsidy has clearly affected the area planted by subsidised farmers: in 2012 it was 11.0 dynyms, or more than four times larger than in 2008. There was also an increase in the planted area of non-subsidised farmers but at a significantly lower level; it only doubled during the studied period to reach 7.2 dynyms in 2012. Government subsidy also had a clear impact on increasing the number of olive trees and this was in line with the finding that the area under olives and vines had increased.

An average Albanian farm is small (1.2 ha, according to MARWDA, 2014), agricultural land is often not fully utilised and thereby there is presently a lack of economies of scale. The significant net positive impact of government support on the olive and vineyard areas highlights the opportunity for farmers to benefit from emerging economies of scale.

### Government subsidy and olive and vineyard yields

Government subsidy did not have a statistically significant impact on crop yield per hectare. The B coefficients associated with Subsidy_2008 for both the olive and vineyard sectors are statistically insignificant (Table 5).

**Table 4:** Impact of government subsidy on area planted with olives and vineyards.

| Model | Unstandardised coefficients | | Standardised coefficients | t | Significance |
|---|---|---|---|---|---|
| | B | Std. error | Beta | | |
| (Constant) | 4.40 | 0.99 | | 4.43 | 0.00 |
| Area planted with olives and vineyards in 2008 | 0.88 | 0.14 | 0.39 | 6.09 | 0.00 |
| Subsidy 2008 | 4.39 | 1.24 | 0.22 | 3.51 | 0.00 |

Dependent variable: area planted with olives and vineyards in 2012
Source: own calculations

**Table 5:** Government subsidy impact on yields per hectare of olives and vineyards.

| Activity | Model | Unstandardised coefficients | | Standardised coefficients | t | Significance |
|---|---|---|---|---|---|---|
| | | B | Std. error | Beta | | |
| Olives | (Constant) | 1.29 | 0.95 | | 1.35 | 0.17 |
| | Yield in 2008 | 0.86 | 0.10 | 0.64 | 8.58 | 0.00 |
| | Subsidy in 2008 | 0.81 | 1.28 | 0.04 | 0.63 | 0.52 |
| Vineyards | (Constant) | 7.62 | 5.95 | | 1.28 | 0.20 |
| | Yield in 2008 | 1.97 | 0.48 | 0.42 | 4.09 | 0.00 |
| | Subsidy in 2008 | 2.43 | 7.49 | 0.03 | 0.32 | 0.74 |

Dependent variable: yield in 2012
Source: own calculations

In 2012, subsidised farmers produced 3.1 t $ha^{-1}$ of olives and 13.1 t $ha^{-1}$ of grapes, while non-subsidised farmers produced 3.8 t $ha^{-1}$ and 21.1 t $ha^{-1}$ respectively. Although there has been positive development in terms of increasing yields per hectare for both groups, no significant net effect of subsidy was found. This missing net impact of government subsidy on crop yields per hectare may be explained if considered jointly with an analysis on technology adoption. Subsidised famers, as a rule, used common technology in terms of cultivars, plant protection materials, pesticides and machinery, including sprayers (Skreli and Imami, 2013).

The olive cultivar mix in Albania has undergone major changes during the social and economic transition period. New intensive cultivars have been introduced and the olive cultivar mix is quite modern. In anecdotal cases 'treated' farmers have introduced new cultivars, but the difference between subsidised and non-subsidised farmers is not significant. The grape cultivar mix needs improvement however, particularly when it comes to those intended for wine production. The government subsidy impact in terms of grape cultivar mix remains limited.

The impact of government subsidy on the introduction of drip irrigation[2] has been negligible when compared to the level of investment in drip irrigation technology by the non-subsidised group (Skreli and Imami, 2013). While one in four non-subsidised farmers have introduced drip irrigation in olive and grape orchards, the share of subsidised farmers who have introduced drip irrigation is only is 16 per cent – a substantially lower figure.

Commonly-available plant protection materials and fertilisers are used both by subsidised and non-subsidised farmers, with only a limited number having reported using any new types of pesticides or fertiliser, but not necessarily belonging to the subsidised group of farmers. The agricultural machinery, including spraying technology, is very similar for both subsidised and non-subsidised farmers, and again it is common technology.

Overall, the impact of government subsidy on the introduction of new technology has been weaker than the impact of own money spent by farmers to create new olive and grape production areas. It could be argued that such a phenomenon stems from 'moral hazard' – farmers tend to consider the soundness of the investment less when they do not have to pay the full cost of it. Qualitative information suggests that, in some cases, farmers do not provide the necessary services to the new plantings after obtaining the subsidy and in a few extreme cases they even completely abandon the new plantings (Skreli and Imami, 2013).

## Government subsidy and farm size and on-farm employment

Government subsidy had no impact on farm size; the net impact represented by the coefficient B associated with Subsidy_2008 (0.30 dynym) is statistically insignificant and the p-value of 0.41 suggests however that the result may be due to chance (Table 6).

**Table 6:** Government subsidy impact on farm size.

| Model | Unstandardised coefficients | | Standardised coefficients | t | Significance |
|---|---|---|---|---|---|
| | B | Std. error | Beta | | |
| (Constant) | 0.36 | 0.38 | | 0.95 | 0.34 |
| Farm size in 2008 | 0.98 | 0.01 | 0.96 | 51.68 | 0.00 |
| Subsidy in 2008 | 0.30 | 0.37 | 0.01 | 0.81 | 0.41 |

Dependent variable: farm size in 2012
Source: own calculations

**Table 7:** Government subsidy impact on part-time, on-farm employment.

| | Unstandardised coefficients | | Standardised coefficients | t | Significance |
|---|---|---|---|---|---|
| | B | Std. error | Beta | | |
| (Constant) | 0.63 | 0.14 | | 4.37 | 0.00 |
| Part time farmers in 2008 | 0.80 | 0.06 | 0.65 | 12.40 | 0.00 |
| Subsidy in 2008 | 0.36 | 0.19 | 0.10 | 1.89 | 0.05 |

Dependent variable: part time farmers in 2012
Source: own calculations

The two groups had similar farm sizes in 2008: 15.0 dynyms for the subsidised farmers and 14.9 dynyms for their non-subsidised counterparts. While farm size for non-subsidised farmers increased by 0.09 dynyms over the period 2008-2012 (15.1 dynyms in 2012), it increased by 0.39 dynyms for subsidised farmers (15.4 dynyms in 2012), or a net difference of 0.3 dynyms. However, the differences are statistically insignificant and can be interpreted as indicating a lack of impact of government subsidies on farm size.

Although there are signs of an active land rental market, this has not affected farm size. In a limited number of cases (6 per cent of farmers), subsidised farmers have rented land to establish olive and grape production areas. The area rented is between 0.5 ha and 2.3 ha. Qualitative information from the field interviews supports the idea that the land rental market is an opportunity with land managed by rural communes. The rental of private land for establishing new olive and grape production areas is a rather unlikely option given that land ownership titles are perceived to be insecure.

Since reported full-time, on-farm employment is anecdotal, only the results of part-time on-farm employment[3] are discussed below. Government subsidy has had a substantial significant impact on increasing on-farm part-time employment (Table 7).

The two groups of farms had similar values in terms of part-time employment per farm in 2008: 0.74 part-time farmers for non-subsidised farmers and 0.99 part-time farmers for subsidised farmers. While subsidised farms employed on average 1.80 part time employees, non-subsidised farmers employed only 1.23 employees. Although there was an increase in part-time on-farm employment for both groups, that for the subsidised group was significantly higher than for the non-subsidised group, the net difference being 0.36 part-time employees per farm. The results by sector suggest that the increases in part-time on-farm employment for both the olive and vineyard sectors were significant, with slightly higher values for the vineyard sector.

[2] Although drip irrigation is not nowadays considered an innovation, its incidence is still limited and therefore it is considered a new technology.

[3] Part-time workers in the olive and vineyard sectors deal mainly with some specific operations such as land tilling, pruning and fruit picking. Based on expert assessment, 'part time' in the considered sectors may be converted to at most 0.25 AWU.

## Discussion

This paper analyses the outcomes and possible impact of Albanian farm subsidy schemes using a quasi-experimental design by applying PSM method. The results show that the government subsidy scheme had a clear net impact on increasing areas under olive and grape production. The positive impact on area planted with olives and vines had not affected farm size, however. Furthermore, the impact of subsidies on part-time on-farm employment was positive, while its impacts on technology adoption and crop yield per hectare were not significant.

Our results are generally in line with the majority of the cited literature, showing that agricultural subsidy programmes have a rather mixed impact. We found that Albania's agricultural subsidy policy had a direct impact on production capacities (area and production), suggesting an 'early stage' for the Albanian agricultural sector. The results regarding impact on technical efficiency are in line with those of Minviel and Latruffe (2014) and Zhu and Lansink (2010), who found mixed relationships between agricultural subsidies and efficiency. As expected, subsidy positively affects part-time on-farm employment but no significant impact was found in terms of bringing idle land into the economic cycle, contrary to what we hypothesised.

Supporting investment in new fruit production areas became part of the Albanian policy agenda only recently, starting from 2008. Impact evaluation of the scheme in 2012, only four years from its start, is an important limitation of the study. Despite the assumption that this is a sufficient time frame for the scheme to have an impact, we are aware that that only partial impacts are discussed and analysed. This is due to the fact that although intensive olives and vineyards enter production by the third year, they only reach full production by the sixth or seventh year. The results most affected by this limitation are yields per hectare and the least are area planted with olives and vineyards, and employment. Another limitation of the study is the small sample size which is likely to lead to higher margins of error. Furthermore, despite our balanced selection of counties (south and north), random selection of communes and quasi-random selection of farmers prompts caution about generalising the results at the country level. On the other hand, given the lack of baseline data, the study looks at the selected indicators only in retrospect, meaning using self-reported data from farmers related to their performance in recent years.

Our research findings can be relevant for government agencies and other stakeholders which have engaged or plan to engage in investment support schemes in the Albanian agriculture sector. It is recommended the government continues its support for creating new fruit production areas. Given the small average farm size, Albanian agriculture needs support to establish commercial farms and the current scheme is an effective way to link small farms with markets. A measure which is an investment support scheme is superior to output/price support – it is less trade distortive and has a lower negative budget impact. Caution should be made of the complex effect in the longer run, however. As the domestic market may saturate for different products, further increased production may cause a sharp decline in sales prices which can make the farmers' financial situation worse off. Therefore, support schemes for given agricultural activities should be anticipated by an in-depth market outlook.

Support to investment in labour-intensive industries, if well designed, tends to affect farm income and employment generation positively. Our study results support that there is a significant increase in part-time on-farm employment, meaning that the subsidy scheme has had a positive impact in terms of addressing the hidden unemployment problem which is a critical one for Albanian agriculture.

Our survey data suggest that a large proportion of farmers have not mobilised any additional resources after benefiting from government subsidies and new technology adoption has been limited. The study findings may be used to encourage the government to introduce conditionality – to use subsidy to meet more than one policy objective. Recommended policy objectives to be followed are new technology adoption and financial resource mobilisation.

While the rental market of private land is dysfunctional, anecdotal evidence suggests that farmers rent the commune-managed land for establishing new fruit production areas. The government may therefore design a policy to promote the use of commune-managed land for this purpose. The policy mix should consider reducing local government discretion in renting out the land, designing incentives for local government based on land transactions, and providing bonus points in file evaluations in case of local government managed land rented, to mention only a few possible measures.

Skreli and Imami (2013) found that for 25 per cent of subsidised farmers, investment is equal or close to the level of the government subsidy, meaning that no additional resources are mobilised. Additionally, the impact of subsidies in introducing new technologies is significantly lower than the impact of farmers' own money. Based on these facts it is argued that a 'moral hazard' problem is associated with government subsidy. More in-depth investigation is however suggested in order to better understand this phenomenon.

## Acknowledgements

This paper is based on a study/survey developed under the framework of the project 'Preparation of Inter-sectorial Strategy for Agriculture and Rural Development in Albania', financed by the EU and implemented by the FAO with the support and cooperation of the Albanian Ministry of Agriculture, Food and Consumer Protection (now named Ministry of Agriculture, Rural Development and Water Administration).

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