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**“Consumer preferences for cheese with focus on food safety – a segmentation analysis”**

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**Abstract**

This research provides an understanding of Albanian urban consumer preferences and purchasing behaviour related to cheese focusing on origin, packaging, food safety and certification. This paper, based on a structured consumer survey and analysis, consists of two-step cluster and descriptive statistics. Key socio-demographic variables, namely gender, education, and age, were used as input clustering variables obtaining 5 different clusters. Most consumers across all identified clusters prefer buying unpacked cheese to packed cheese – consumer clusters with university education are more likely to purchase packed cheese compared to other consumer groups. Consumer clusters with university education also prefer to buy cheese mainly in supermarkets as compared to other clusters that prefer convenience shops. Regarding Hazard Analysis Critical Control Point (HACCP), most consumers are not aware of it – consumer clusters with university education appear more informed about both HACCP and International Standards Organization (ISO) when compared to other (less educated) consumer clusters). Low trust in state institutions to guarantee food safety calls for the need to strengthen their capacities, professionalism, and awareness engagement with consumers to improve their perceptions and awareness.

**Keywords**: consumer preferences, packaging, cheese, Albania

1. **Introduction**

One of the major concerns among consumers in developing or transition countries, characterised by weak law enforcement systems and limited resources is food safety. The concerns are often more pronounced in the case of livestock products. Dairy and meat products have been considered problematic regarding food safety also in the case of Albania, a post-communist emerging economy, which is also the focus of this paper (Vercuni et al, 2016; Zhllima et al, 2015).

As food safety is a credence attribute, use of cues for inferring safety (and other aspects of quality) is linked to trust. In developed countries with consolidated institutions, consumers tend to trust public institutions and/or supermarket chains to guarantee food safety (Gunert et al, 2021). In the case of countries with a weak institutional framework, such as Albania, the level of trust in public institutions to guarantee food safety may be lower and consumers could trust more in the retailer than in public institutions for guaranteeing food safety. In addition to developing trust in the retailer, when possible, consumers prefer often to buy food directly from producers as a strategy to ensure safety and quality. Consumers’ trust is traditionally directly related to the short value chain (FAO, 2020). According to a recent survey, information about expiry date, domestic origin/local origin, knowing the producer or the brand name are the most frequently used food safety and quality cues for Albanian consumers (Haas et al, 2021).

As highlighted earlier, livestock products, namely meat and dairy products, are exposed to food safety problems. The problems related to food safety and their perception by consumers for livestock products have been identified by several studies - as a result, food safety has been becoming a factor of increasing importance for consumers (Grunert et al., 2021). On the other hand, dairy (and meat) products are important elements of the Albanian consumer.

This paper analysis the consumer preferences towards key attributes related to the purchase of cheese product in Albania focusing on the evaluation of Albanian consumer behaviour and preferences for main product attributes such as packaging, place of purchase and origin of the product (domestic or import) and illustrate these preferences according to groups of consumers.

The paper is structured as follows: second section consists of the literature review, third section describes the methods, the fourth section shows the results while the last section consists of discussions and conclusions.

1. **Literature review**

Consumer purchasing behaviour is a complex process. Consumers are oriented between research, experience and credence characteristics to evaluate the product before purchase, after purchase and the implications this brings (Grunert, 2005). Consumer behaviour regarding the perception of food quality, which applies also to the case of cheese, is related to: taste, effect on health, convenience and characteristics of the way it is produced (Grunert, 2005).

Packaging constitutes one of the most important factors in the decision to purchase products thus becoming an essential aspect of the product purchasing process (Silayoi and Speece, 2004). Packaging creates the first impression (Holmes and Paswan, 2012), as the buyer first comes in contact with the packaging and then with the product itself (Gofman and Moskowitz, 2010). The role of packaging for consumers is becoming the main tool for communication and branding (Rettie and Brewer, 2000). The consumers also use packaging as an indicator of quality. The consumers create a relationship of symmetry between packaging and product quality (Silayoi and Speece, 2004).

Cheese can be purchased packaged or unpackaged and this can have an impact on the consumer preference for this product. On one hand visibility or touch of the product can play an important role in its purchase. When consumers are unable to identify the product from the packaging, they can use circumstantial factors that guide their choice such as; colours, shapes, size of objects (Galotti, 1994). A differentiation strategy for cheese product sellers is to present the entire product (uncut cheese wheel) on the counter and leave the seller to cut and roll the cheese at the customer’s request (Colonna et al., 2011). There are fewer studies on the impact of socio-demographic factors on the packaging elements themselves (Baruk and Iwanicka, 2016). According to Baruk and Iwanicka (2016) who studied polish customers, the age, gender and level of education influences the hierarchy of their expectations concerning packaging connected with dairy products.

Another attribute that can be analysed in the case of food products is the place of their purchase. The place of purchase associated with the purpose of using the product is a factor that must be taken into account when assessing consumer preference. Consumers prefer different grocery stores for a variety of reasons: lack of items, prices and promotional campaigns, time constraints, impulse buying and convenience are some reasons (Skallerud et al., 2009)

In terms of cheese type and place of purchase it seems that many consumers are choosing more artisanal and ethnic cheese as part of their daily routine, in part because of its greater exposure (FPCIANR, 2001). But food purchasing patterns differ across countries. According to Yadav and Verma (2015), the Indian consumer perceives that food markets offer lower prices and more shopping benefits compared to conventional stores but are less satisfied with the service provided by them.

Consumer preferences can also be assessed towards the origin. In creating the concept of food quality, aspects such as research, experience, reliability attributes are taken into account (Anderson and Anderson, 1991). Origin can only become an indicator of improved quality if it is the source of origin related to food safety or higher quality (Loureiro and Umberger, 2007). Various researches have been done considering consumer preferences for imported food focused on reliability attributes (Gedikoglua and Parcell, 2014). Also, previous research has shown a strong preference of Albanian consumers for domestic cheese (Imami et al, 2016a) while origin is perceived to be linked to (food) safety and quality (Haas et al, 2021).

Food safety is also important. Certification strategies have been developed to improve consumer perception of food safety, with the main objective to transform food safety from a credence attribute to a search attribute. However, certification has not always achieved or significantly improved food safety perception for some products (Corcoran et al., 2001; Young et al., 2009). Previous research has found that other attributes are considered more important than certification by consumers (Tendero and Bernabe´u, 2005). While brand reputation and certificates (HACCP, ISO 9000) seem to be slightly more important among Albanian consumers (Haas et al., 2021).

1. **Data and methods**

**Sampling**

This study was conducted with face-to-face interviews, administered on a sample of consumers in the urban area of Tirana, the largest urban area and market in Albania. Data collection took place during November 2012. A total of 220 face-to-face interviews were administered, but 20 questionnaires were excluded from the analysis due to incomplete responses.

The locations were selected based on previously conducted focus groups, where two different and highly frequented locations, with many different types of consumers, were suggested for the study. In the selected sites, interviews were conducted by trained students. The participants were recruited by a mall-intercept sampling procedure. People were approached randomly, and subsequent to the completion of each face-to-face interview, interviewers approach the next closest passer-by.

Table 1 below provides data on key socio-demographic variables from sample and population. Overall, the sample structure is similar to the population structure both in terms of gender and age.

**Table 1**: Socio demographic Comparison of Survey Respondents with Tirana’s Population

|  |  |  |
| --- | --- | --- |
| **Indicator** | **Survey respondents** | **Tirana population** |
| Gender  | Male | 53.0% | 50.1% |
| Female | 47.0% | 49.9% |
|   |
| Age | 18-24 | 19% | 20.6% |
| 31-35 | 7.5% | 10.7% |
| 36-40 | 12.5% | 11.4% |
| 41-45 | 9.0% | 11.8% |
| 46-50 | 14.5% | 10.5% |
| 51-55 | 13.0% | 8.6% |
| 56-60 | 8.5% | 6.7% |
| 61-64 | 7.0% | 6.5% |
| 65 and up | 9.0% | 13.3% |

Source: Field Survey and INSTAT (for population)

**Two-step cluster approach**

The consumer sample was classified through a two-step clustering technique, based on key socio-demographic variables utilised as input factors. Two-step cluster has been applied in many consumer studies – this approach has also been applied in previous studies on Albanian consumers related to preference for meat, olive oil and organic food (Imami et al, 2013; 2017, Zhllima et al, 2017).

The two-step cluster analysis (SPSS statistical package) is an exploratory and unsupervised multivariate data analysis technique, which allows for the clustering of large data sets that considers both continuous and categorical variables in the same clustering procedure (Chiu et al 2001). This method is based on a probabilistic approach, in which the clustering algorithm utilises a likelihood distance measure as the similarity criterion, and the most suitable number of clusters is chosen on the basis of Schwarz's Bayesian inference criterion (BIC). The main advantage of this clustering procedure is that the influence of researcher’s subjectivity is reduced and the randomness of traditional clustering techniques is avoided (Norusis, 2003).

1. **Results**

In this section of the analysis, typical socio-demographic variables were utilised as clustering variables, such as gender, education and age. A 5-cluster solution was obtained with a relatively high Silhouette Coefficient (0.6), indicating acceptable clustering for further analysis (Table 5).

The following clusters were obtained:

- Cluster 1 (MEF - middle-educated female consumers): contributes to 17.5 per cent of the whole sample. It consists of only female consumers with high school education (normally 12-13 years). The average age is 48.

- Cluster 2 (HEF - high-educated female consumers): contributes to 24.5 per cent of the sample. It consists of only female consumers with university education. The average age is 38. This cluster can be named: “educated female consumers”.

- Cluster 3 (LE - low-education consumers): contributes to 13 per cent of the whole sample. It is different from the other clusters, as both genders are included, 61.5 per cent are males. Most consumers in this cluster (96 per cent) have basic education (typically 8 years of education). The average age is 55.

- Cluster 4 (HEM - high-educated male consumers): contributes to 20.5 per cent of the sample. It consists of only male consumers with university education. The average age is 37. This cluster can be named: “educated male consumers”.

- Cluster 5 (MEM - middle-educated male consumers): contributes to 24.5 per cent of the whole sample. It consists of only male consumers with high school education (normally 12-13 years of education). The average age is 48.

**Table 2**: Cluster analysis results, BIC 15, Silhouette Coefficient = 0.6

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Input variable | Cluster 1 – MEF | Cluster 2 – HEF | Cluster 3 – LE | Cluster 4 – HEM | Cluster 5 – MEM |
| Size | 17.5% (35) | 24.5% (49) | 13% (26) | 20.5% (41) | 24.5% (49) |
| Education | High school 100% | University 100% | Basic education 96% | University 100% | High school 100% |
| Gender | Female 100% | Female 100% | Male 61.5% | Male 100% | Male 100% |
| Age | 48 | 38 | 55 | 37 | 48 |

Source: Field Survey

The identified consumer segments/classes were further subject to assess differences in perceptions or behaviour applying Pearson’s Chi-Square.

Cluster 2 and 4 (respectively, female and male consumers with university education) prefer to buy cheese mainly in supermarkets (Table 3). The other three clusters prefer primarily convenience shops.

**Table 3:** Main outlet where cheese is purchased/sourced

|  |  |  |  |
| --- | --- | --- | --- |
| Cluster | Indicator | Place of buying cheese | Total |
| Dairy shop | Supermarket | Convenience shop | Dairy factory | Other |  |
| Cluster 1 – MEF | Count | 9 | 5 | 18 | 0 | 3 | 35 |
| Percentage | 25.7% | 14.3% | 51.4% | 0.0% | 9% | 100% |
| Cluster 2 – HEF | Count | 11 | 25 | 8 | 1 | 4 | 49 |
| Percentage | 22.4% | 51.0% | 16.3% | 2.0% | 8% | 100% |
| Cluster 3 – LE | Count | 5 | 1 | 12 | 1 | 7 | 26 |
| Percentage | 19.2% | 3.8% | 46.2% | 3.8% | 27% | 100% |
| Cluster 4 – HEM | Count | 6 | 14 | 11 | 4 | 6 | 41 |
| Percentage | 14.6% | 34.1% | 26.8% | 9.8% | 15% | 100% |
| Cluster 5 – MEM | Count | 11 | 10 | 18 | 0 | 10 | 49 |
| Percentage | 22.4% | 20.4% | 36.7% | 0.0% | 20% | 100% |
| Total | Count | 42 | 55 | 67 | 6 | 30 | 200 |
| Percentage | 21.0% | 27.5% | 33.5% | 3.0% | 15% | 100% |
| Pearson’s Chi-Square p-value = 0.000 |

Source: Field Survey

About 91 % of the consumers state that they usually buy unpacked cheese (thus only 9 % usually buy packed cheese). However, when asked about their preferences, almost 25 % of the consumers prefer to buy packed cheese (Table 4). Consumers belonging to the HEF and HEM clusters (respective female and male consumers with university education) are more inclined towards packed cheese, although, even within these two clusters, the majority prefer purchase unpacked cheese.

**Table 4:** Preference for packaging of purchased cheese

|  |  |  |  |
| --- | --- | --- | --- |
| Cluster | Indicator | Type | Total |
| Packed | Not packed |
| Cluster 1 – MEF | Count | 4 | 31 | 35 |
| Percentage | 11.4% | 88.6% | 100% |
| Cluster 2 – HEF | Count | 20 | 29 | 49 |
| Percentage | 40.8% | 59.2% | 100% |
| Cluster 3 – LE | Count | 4 | 22 | 26 |
| Percentage | 15.4% | 84.6% | 100% |
| Cluster 4 – HEM | Count | 12 | 29 | 41 |
| Percentage | 29.3% | 70.7% | 100% |
| Cluster 5 – MEM | Count | 9 | 40 | 49 |
| Percentage | 18.4% | 81.6% | 100% |
| Total | Count | 49 | 151 | 200 |
| Percentage | 24.5% | 75.5% | 100% |
| Pearson’s Chi-Square p-value = 0.012 |

Source: Field Survey

Most consumers are not aware of HACCP, but they tend to be more familiar with ISO – consumers’ clusters with university education appear more informed about both HACCP and ISO when compared to other (less educated) consumer clusters).

**Table 5**: Answer to the question “do you know/are you aware of ISO and HACCP?”

|  |  |  |  |
| --- | --- | --- | --- |
| Cluster | Indicator | HACCP | ISO |
| Yes | No | Total | Yes | No | Total |
| Cluster 1 | Count | 2 | 33 | 35 | 16 | 19 | 35 |
| Percentage | 6% | 94% | 100% | 46% | 54% | 100% |
| Cluster 2 | Count | 22 | 27 | 49 | 36 | 13 | 49 |
| Percentage | 45% | 55% | 100% | 73% | 27% | 100% |
| Cluster 3 | Count | 1 | 25 | 26 | 4 | 22 | 26 |
| Percentage | 4% | 96% | 100% | 15% | 85% | 100% |
| Cluster 4 | Count | 19 | 22 | 41 | 28 | 13 | 41 |
| Percentage | 46% | 54% | 100% | 68% | 32% | 100% |
| Cluster 5 | Count | 3 | 46 | 49 | 22 | 27 | 49 |
| Percentage | 6% | 94% | 100% | 45% | 55% | 100% |
| Total | Count | 47 | 153 | 200 | 106 | 94 | 200 |
| Percentage | 24% | 77% | 100% | 53% | 47% | 100% |
| Pearson’s Chi-Square p-value | Chi-Square = 0.000 |  Chi-Square = 0.000 |  |

Source: Field Survey

1. **Discussion of the results and conclusions**

This research provides an in-depth understanding of consumer perceptions and aspects of related to purchasing behaviour were identified. In the demographic segmentation, based on a two-step cluster analysis, the socio-demographic variables of gender, education and age, were used as input clustering variables. Five clusters with significant differences related to gender and education were obtained. High-educated female (HEF) consumers and high-educated male (HEM) consumers prefer to buy cheese mainly in supermarkets, whereas other consumer groups prefer other points of sale. Most consumers across all identified clusters usually buy unpacked cheese and prefer to continue buying this unpacked cheese over packed cheese. However, consumers belonging to the HEF and HEM clusters (respective female and male consumers with university education) have a tendency to purchase packed cheese, even though within these two clusters the majority prefers unpacked cheese.

Regarding HACCP, most consumers are not aware of it – consumer clusters with university education appear more informed about both HACCP and ISO when compared to other (less educated) consumer clusters). There is an overall preference for domestic cheese over the imported counterpart for identified consumer groups. This finding is in line with previous research that shows a strong preference of Albanian consumers for domestic cheese (Imami et al, 2016a).

The results of this study provide useful information for Albanian cheese producers and policy makers. Food policy makers and law enforcement institutions should ensure labelling of cheese, providing complete information on production technology and origin. Moreover, labelling information should be guaranteed and reliable to earn the consumer trust. Marketing managers should take into consideration the orientation of the Albanian consumers toward quality and transparency.

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**Impact of Covid-19 on agriculture sector – the case of Albania**

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**Abstract**

In addition to the major health global crisis that it has caused, Covid-19 pandemic has had serious consequences in every economy regardless of their income level. The restrictive measures generated large disruptions, which in turn resulted in a decline in employment, decrease of demand for goods and services, shortages in supply, reduction in trade volumes, and overall GDP contraction. Covid-19 also affected the Albanian agriculture sector. As a result of Covid-19 situation, exports of seasonal agricultural products have been hampered, thus putting pressure on farmers that grow crops in greenhouses, causing total sales drop, at a time when the intensity of production is appreciably higher than the previous years. Limited mobility and restrictions in the access of markets, especially in the beginning of pandemic in March, made farmers reduce the prices of fruits and vegetables at the lowest levels in history, while a considerable amount of them even rot in greenhouses or cultivated fields. Farmers have experienced lack of labor force in processes like harvesting and planting in greenhouses production as well as in different services for the medicinal plants (ibid) There is limited in-depth understanding on the Covid-19 impact on the agriculture sector. This paper tends to cast light in this direction and provide a better understanding of Covid-19 impact on the agriculture sector by focusing on Albanian export-oriented value chains.

**Key Words**: Albania, agriculture, Covid-19.

**1. Introduction**

In addition to the major health global crisis that it has caused, Covid-19 pandemic has had serious consequences in every economy regardless of their income level. The implemented lockdowns contributed to the slow-down of economic activities, leading to shocks from both supply and demand sides. The restrictive measures that were applied generated large disruptions, which in turn resulted in a decline in employment, decrease of demand for goods and services, shortages in supply, reduction in trade volumes, and overall GDP contractions. Different studies and reports, including IMF (2020) conclude that world is facing the worst downturn, since WWII. More specifically, the first months proved that the economy resulted to a 5.2% loss in world GDP and generation of the deepest recession curve (Canuto, 2020).

One of the most crucial economic challenges, derived by the high degree of globalization, is the disruption of global value chains and international trade which emerged after the hindering of production and the disturbances in demand or investments (Baldwin and Freeman, 2020). The United Nations (2020) analysis regarding the impact on trade and development, affirmed that developing countries are expected to endure a severe impact on poverty rates and food insecurity. On the other hand, the Covid-19 pandemic (through higher unemployment, lower income, and uncertainty) has affected negatively aggregate demand and consequently consumption (Baldwin and Mauro, 2020).

There was a contraction of the Albanian economy during 2020, linked strongly to reduced consumer spending (Harri et al., 2020). The pandemic not affected households’ salaries and informal wages as well as remittances which account for a part of their consumption spending. These remittances make up around 9.5% of the national production in Albania (Musabelliu, 2020), but after the economic crisis caused by Covid-19, the Word Bank report (2020) estimates a drop of 20% in remittances, which in turn affects the well-being of many households (which depend on remittance), contributing further to decreased demand.

FAO (2020) claims that the damage in agriculture sector, especially in its markets, originate from the alternations that food demand and food supply experience in the dynamic situation of the global pandemic. Border restrictions caused difficulty in the mobility of migrant workers and interruption of trade transactions, which, in turn seriously risked the food availability (ibid). Trade disruption have affected numerous farmers in finding export markets, thus leading to product waste (UN, 2020).

Demand for food products is affected by the increasing uncertainty about the negative impacts Covid-19 exerts. This behaviour appears to be detrimental for the agriculture sector as well, since it directly affects the demand for food products, causing an imbalance in the food market with the main consequence of major losses for the farmers (Elleby et al., 2020). A fall in demand for food is also influenced by the closure of all hotels and restaurants, which buy considerable quantities of food from different farmers. This fall in demand from the largest buyers has caused a general drop in prices of agricultural commodities by 20%, thus hurting severely the farms’ profits (Bhosale, 2020). Some sectors such as food processing (wine) have been affected more.

Covid-19 also affected the Albanian agriculture sector. Comparing to other key sectors of the economy, the agriculture sector is reported to be the least affected sector since almost 81% of the sector either continued to operate fully or partly - the rest (19%) ceased their operations. (Albania Investment Council, 2020). Nevertheless, the farmers and enterprises in this sector have been affected by the restrictive measures, leading to disruptions in inputs supply chains, production processes, market channels and sales. In fact, a survey conducted by Union of Albanian Business (2020) reveals that the majority of farmers, respectively 74% of them, are mainly concerned about the decreased demand for goods. Other problems that concern less than half of the interviewed farmers are the human resource restrictions, the insufficient raw materials, and the inadequacy of other business partners for normal operation. The United Nations publication (2020) reports no significant shortages in the market for inputs, where most of the inputs are imported from abroad while partial price increase of inputs was reported. Farmers have experienced lack of labor force in processes like harvesting and planting in greenhouses production as well as in different services for the medicinal plants (ibid)

As a result of Covid-19 situation, exports of seasonal agricultural products have been hampered, thus putting pressure on farmers that grow crops in greenhouses, causing total sales drop, at a time when the intensity of production is appreciably higher than the previous years (Musabelliu, 2020). Limited mobility and restrictions in the access of markets, especially in the beginning of pandemic in March, made farmers reduce the prices of fruits and vegetables at the lowest levels in history, while a considerable amount of them even rot in greenhouses or cultivated fields.

There is limited in-depth understanding on the Covid-19 impact on the agriculture sector. This paper tends to cast light in this direction and provide a better understanding of Covid-19 impact on the agriculture sector by focusing on Albanian export-oriented value chains.

**2. Methodology**

Various sources have been used to collect secondary data. The main sources of information are selected based on the type if conjectural relations from external market or from other sectors which can influence agriculture and related activities.

The primary data/information collection consist of the following:

* About 60 semi-structured in-depth interviews were conducted (varying by the typology and the specifics of each value chain) targeting various categories of actors and experts (this is work in progress; therefore, the number of interviews will be reported in the final report). For the semi-structured in-depth interviews, a snowball survey is used to identify the main actors and experts for each value chain for the semi-structured interviews (part of the primary qualitative research)[[1]](#footnote-1). Separate questionnaires and interview guides were used after testing for each category of value chain actors.
* Structured survey with 137 agriculture extension services specialists, following best practices/examples of cooperation. MARD agriculture extension services specialists are diffused throughout Albania and are well-informed about latest development for all major agri-food value chains. Through the survey was assessed the perceived Covid-19's impact on production, farm sales (quantities), prices access to inputs, advice and investments decisions.
* Structured rapid survey with 535 farmers (see in box the sample characteristics). This was not foreseen in the ToR/RfP or in the inception report (as such is a contribution in kind from the project team), thus it is an important (unforeseen) added value. Semi-structured interviews provide mainly qualitative information and perceptions, the extension structured survey aims to quantify assessment, which are still based on perceptions. To tackle these limitations (limited quantitative assessments and subjectivity characterizing semi-structured interviews), we decided to carry out a structured farm survey, utilizing databases of previous farms surveys, thereby also enabling comparison of farm development dynamics over time (also in conjunction to Covid-19). Interviews were carried out by telephone (as highlighted, this was not part of the ToR or was not foreseen in the budget, and in addition, large field surveys are not feasible under Covid-19 conditions).
* Two focus groups were organized to identify main constrains and validate findings from the survey and semi-structured interviews. One focus group was carried out with fruits value chain actors (consolidators, wholesalers, exporters, and service suppliers) and a second one with greenhouse producers. A constrain analysis, mainly linked with the pandemic period was carried out. Then, focus group members were guided to prioritize in a commonly prepared list, the most effective support measures to be taken for overcoming the bottlenecks of Covid-19.

**3. Covid-19 impact**

During the field survey and secondary data analysis we could observe different prospects from the demand / market viewpoint during the first months of the pandemic, and then a different pattern in the following months. Therefore, in the analysis we pay special attention to the different periods and patterns.

Increased demand has been observed during the first months of the pandemics

During the first months, there was not observed lack of demand – in some cases was observed increased demand, as people bought excessive amounts to face the lockdown.

“During Covid-19, there was increased demand, probably because people spent more time at home eating”, stated one interviewee.

“The first 2 weeks, households had a rush to buy durable food such as spaghetti, but after the first 2 weeks households came back to buy more fruits and vegetables and, in some cases, increased prices were observed”, stated another interviewee.

Demand for food has been adversely affected afterwards

During autumn, sales have decreased – the main impact of Covid19 was on lowering domestic and international markets consumption. For example, one interviewed large exporter claimed that recently they lost 5 trucks of greenhouse vegetable, because they could not sell.

One of the leading exporters claimed they lost 8 million ALL in October alone because they were not able to sell the products. According to one of the largest wholesalers, its supplying farmers could not sell almost ½ of their produce (which was lost).

“This season (October – December) was the ever-worst season that I have experienced during the 22 years I have been in this business” – stated one exporter.

“When the price of products drops, in turn farmer has less money to spend for inputs, which in turn results again in low quality but also lower yield, which implies higher cost per Kg, thus establishing a vicious circle”, stated one trader.

Sales of inputs have decreased by about 1/3 during 2020, according to one major wholesale input supplier (who supplies over 100 input suppliers).

However not all producers and traders faced the same problems. One leading exporter which exports to Northern European markets and who is GlobalGAP certified (group certification), who operates with contracts with farmers and works with farmer groups, claimed that they were not affected, thus, no price decline was observed. Clearly, the type of market, the form of value chain organization, and market diversification strategy play an important role.

The pandemic has emphasized the main difficulties which are inherited from the past. During Covid-19 pandemic there is a slight change in terms of access to services. According to the survey with farmers only 1/5 of the respondents accepted that pandemic has reduced their access to extension services. The figures are almost the same for services provided by local government. The overall business environment, mostly related to other institutions and services, has been impacted according to more than 40% of the respondents.

Table 1: Covid-19 impact enabling environment

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Measurement scale** | **Not at all a problem** | **Minor problem** | **Moderate problem** | **Serious problem** |
| Covid-19 impact on day-to-day business | 57 | 150 | 104 | 207 |
| day to day business - Share of total | 11% | 28.96% | 20.08% | 39.96% |
| Covid-19 impact on access to extension services | 141 | 166 | 129 | 82 |
| access to extension services - Share of total | 27.22% | 32.05% | 24.9% | 15.83% |
| Covid-19 impact on access to local admin. services | 153 | 171 | 128 | 66 |
| Access to local admin. services- Share of total | 29.54% | 33.01% | 24.71% | 12.74% |

*Source: Structured survey*

Limited labor mobility negatively affected agricultural operations

There were cases of people who were afraid of getting Covid-19 as well as those who got sick, and thereby could not make the right services to the plants. One input supplier who produces seedlings and who is also a consolidator/wholesaler, complained that the seedling quality produced in Spring 2020 was bad, because he could not get/transport workers to carry out the services for seedlings. Also, some farmers who had planted seedlings faced temporarily barriers to travel and in some cases the plants withered.

Pandemic related illness put a lot of stress on farmers’ budgets leading to less input use

Affected families, which spent a lot of money to deal with Covid-19, face financial constraints to buy inputs. That implies that some did not buy enough inputs, affecting quality and yield, while others buy only by credit of input suppliers. For example, one leading exporter stated that, due to gaps in services and inputs use, the quality suffered, and that is an issue especially for export-oriented products.

During pandemics arrears were usual

It is known that inputs suppliers have uncollected debt from farmers – during 2020, that increased substantially. One large input supplier stated that the debt doubled during 2020, when compared to previous years. On the other hand, some downstream actors (exporters) complained about late payment from international buyers.

The main source of training and advice are input suppliers. During 2020, there was a halt in trainings provided by inputs suppliers, stated two major input suppliers. Also, public institutions and donor projects have limited their activities in terms of capacity building activities due to Covid-19 restrictions. Some donors have completely banned face-to-face activities, shifting completely online. However, for most average farmers, online training is not the most suitable option.

According to the interviewed exporters, Covid-19 impacted the transport only during the first weeks. For example, in March 2020, one large wholesaler lost 4 tracks loaded with salads, as they were blocked (due to temporary travel restrictions), which resulted into 2.4 million ALL.

Difficulty to travel had other negative effects. Exporters often visit foreign countries to get acquainted with market developments as well as to search for new equipment. Also inputs suppliers visit producers’ plants to become familiar with new inputs. During 2020, the above category of actors stated that they could not make visits, thereby not being able to update with new equipment or inputs.

One problem faced by Covid-19, was the difficulty to meet with people in public institutions. Instead, online meetings have become common. “Lack of physical contact makes it difficult”, stated a manager of an exporting company. For example, an exporter that had won IPARD II fund to build a large storage facility, was facing delays to get the reimbursement/ grant, caused by Covid19 situation/impact.

The findings from the structured farm survey indicate that tomato[[2]](#footnote-2) post-harvest losses in 2020 were significantly higher than in 2019 (P value 0.02 and 0.00 respectively, table 12). The postharvest losses were particularly high during the second production season according to in-depth interviews, and the main reason was difficulty to sell (as shown below). According to one interviewed exporter (one of the leading exporters), some of its supplying farmers could sell only about ½ of their greenhouse production (because of lack of purchasing power) - the rest was lost. Also, production and losses (not harvested production -left in the field) in 2020 are higher than 2019 but the differences are not statistically significant (P value 0.56 and 0.21 respectively).

Table 2: Output and Losses – Tomatoes

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variable** | **Mean** | **Median** | **st.dev.** | **1st\_Qu.** | **3rd\_Qu** | **P value\*** |
| Quantity Produced 2019 (Kv) | 379.25 | 300 | 269.94 | 200 | 500 | 0.56 |
| Quantity Produced 2020 (Kv) | 382.68 | 300 | 280.03 | 200 | 500 |
| Quantity Sold 2019 (Kv) | 317.00 | 265 | 234.64 | 150 | 402.5 | 0.02 |
| Quantity Sold 2020 (Kv) | 289.20 | 200 | 253.40 | 120 | 380 |
| Losses (not harvested) 2019 (%) | 5.33 | 5 | 5.81 | 0 | 10 | 0.21 |
| Losses (not harvested) 2020 (%) | 6.05 | 5 | 7.09 | 0 | 10 |
| Post-Harvest Losses (2019) (%) | 16.20 | 10 | 14.34 | 5 | 22.5 | 0.00 |
| Post-Harvest Losses (2020) (%) | 26.78 | 25 | 22.39 | 13.75 | 31.25 |

*Source: Authors based on farm structured survey \*P value for Yuen’s trimmed mean t-test*

Table 3: Yuen’s trimmed mean t-test – Tomatoes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **tr. mean dif** | **95% CI** | **test stat.** | **df** | **p-val** |
| Quantity Produced  | -5.13 | -22.38 | 12.13 | -0.59 | 79 | 0.56 |
| Quantity Sold  | 28.31 | 3.80 | 52.82 | 2.30 | 79 | 0.02 |
| Losses (not harvested)  | -1.02 | -2.66 | 0.61 | -1.26 | 43 | 0.21 |
| Post-Harvest Losses  | -10.80 | -16.46 | -5.14 | -3.83 | 55 | 0.00 |

Source: Authors based on farm structured survey

As highlighted above, the sold quantities were lower during 2020, thereby postharvest losses higher, due to difficulty to sell. The farm survey results show that 31.4% of the farmers have found it more difficult to sell during 2020 when compared to the previous 3 years and 25.6% much more difficult (Table 24).

Table 4: Perception of Covid-19 impact on sales – Tomatoes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Measurement scale** | **1** | **2** | **3** | **4** | **5** |
| Product Sales in 2020 VS last 3 years | 8 | 39 | 26 | 13 | 0 |
| Product Sales - Share of total | 9.3% | 45.3% | 30.2% | 15.1% | 0.0% |
| Number of Buyers in 2020 VS last 3 years | 3 | 21 | 51 | 11 | 0 |
| Number of Buyers - Share of total | 3.5% | 24.4% | 59.3% | 12.8% | 0.0% |
| Selling difficulty in 2020 VS last 3 years | 0 | 6 | 31 | 27 | 22 |
| Selling difficulty - Share of total | 0.0% | 7.0% | 36.0% | 31.4% | 25.6% |

*Source: Authors based on structured farm survey (*Note: Likert scale for Product sales and Number of Buyers is: 1=much lower, 2=lower, 3=same, 4=higher, 5=much higher; Likert scale for Selling difficulty is: 1=much easier, 2=easier, 3=same, 4=more difficult, 5=much more difficult)

**4. Conclusions and Recommendations**

The Covid-19 pandemic has caused new problems in the agriculture sector and generated a sense of urgency to address some of them. What is more important, is that the Covid-19 pandemic impact brought back into the attention long prevailing institutional constrains which impede the sector to achieve its full potentials.

The long prevailing constrains require systemic actions to be taken by prompting new concepts and modernizing national and local policies as well as improving government capacities to apply and finance inclusive, gender-responsive, and evidence-based policies. The emerging problems, especially the one appearing in the early period of the pandemic should be addressed through a separate package of interventions. More attention should be given into establishing multisectoral approaches and preparing coordinated interventions between the two layers of government.

Evidence suggests that when written contracts were applied, the positioning of the contracting parties was better during Covid-19. Thus, contracting has proven to be relevant option to reduce negative effects. This was also the case of large exporters of fresh vegetable. In terms of concrete actions, exporters who have established somehow stable relations with farmers, can be assisted to identify and penetrate in better market segments which operate with written contracts, such as supermarket chains. In that case, the exporter can be supported to contract farming. Market intelligence and information systems are necessary. This strategy may work best if coupled with safety standards certification (such as Global GAP – see below).

There are several interventions that can be applied by individuals or groups of producers such as:

* Direct sale windows and use of smart sales (e.g., online selling).
* Networks of solidarity shops sharing same territory of origin but different customers.
* Promotion of diversification activities at farm level.

In order to improve positioning in the export markets, safety and quality standards should be improved. More specifically, shifting market orientation from the regional markets (with low purchasing power and prices) to central and northern European markets (with higher purchasing power, prices and also higher demand for standards). That requires interventions targeting the weakest points, as highlighted below.

*Certification*. There is a potential to scale up GlobalGAP certification, which improves export market positioning. There are several cases of horticulture producers who have been certified with GlobalGAP – GlobalGAP represents an advantage to export more attractive EU markets. Indeed, thanks to GlobalGAP certification, Albanian horticulture products now are present also in Scandinavian markets, which on one hand are very demanding in terms of standards, while on the other hand, they offer attractive prices. Concrete interventions are feasible, such as supporting exporters who intend to introduce group certification jointly with farmer’s groups.

Collective action based on trust is a critical determinant of competitiveness. Pilot projects on cluster development (in one of the identified clusters), providing producer organization support (in a narrow area) and carrying contract farming (in exportdriven value chains) can be tested.

Besides being a key determinant of enhancing overall agricultural system competitiveness, collective action may also serve as a mechanism to mitigate pandemic effects. As we have discussed; vertical collective action (vertical coordination and contract farming) has been beneficial for farmers; horizontal cooperation or producers’ groups (to be piloted) may be mechanisms to reduce production losses and assure better farm prices for farmers by withdrawing excess supply from the market but also by improving product quality and marketing; sector based collective action, IBOs, may develop a mid to long term view for the sector and promote innovation, product safety and quality which are key to access high income markets; and local collective action, clusters, are critical to innovation, product quality and access to high income markets.

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**Factors influencing students’ performance – the case of Agricultural University of Tirana**

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**Abstract**

Increasing the quality of teaching and obtaining a better learning outcome/result is an important priority for higher education institutions. Despite the importance, there is a lack of evidence on factors influencing the student’s performance in the case of Albania. This paper aims to fill this gap by studying the factors that affect student performance in Albania focusing on the Agricultural University of Tirana. The analysis is based on data collected from the GRADUA platform (which provides a new and unique database on students’ performance and career expectations) as well as administrative data obtained at the Agricultural University of Tirana. Results of the analysis show a significant and positive association of students performance level not only related to the high school average but also the employment of the student in the labour market during the study period, percentage of attendance in lecturing hours as well as previous student motives in pursuing the study program. Findings reveal clear differences according to gender and provide evidence for interventions at policy level and institutional restructuring of the University strategic management with focus on the role of university administration as well as teaching personnel.

**Keywords:** Student performance, correlation analysis, motivation, attendance, gender.

1. **Introduction**

Student performance at universities is a crucial element for the youth integration in the labour market. Scrutinising the possible determinants of students’ performance is vital to policymakers and researchers as well as academic institutions when designing their strategic plans (Fraser, W., Killen, R., 2005). The understanding (assessment) of the factors which influence students’ performance, is very important for policy-makers to prepare a successful transition for youth from the secondary level to tertiary level, where the most important focus remains the admissions policies. In addition, universities are responsible to adopt different policies for attracting enrolments and orienting graduates as well as special interventions for increasing capacities of teaching and supporting staff, by first examining the way how students’ performance is influenced.

There are various academic, social, emotional, cultural and financial factors that impact students entry and performance, factors which frequently appear to be interdependent in terms of influence (Nel et al, 2009; Pennington et al, 2018).

This paper aims to explore the role of factors influencing the university students’ performance, in the context of a post/socialist country, namely the case of Albania. Albania is chosen due to being subject of several reforms happening to the legal and institutional components of the higher education system. Albanian higher education has gone through several important stages in the recent three decades. Before the 1990s there was a total lack of autonomy, while during the years 1990-1994 the signed the beginning of tertiary education liberalisation (Zhllima et al, 2018). However, the autonomy was at a non-significant stage (FRRHESR, 2014). The new Law on Higher Education in 1999 came as a necessity to allow and regulate the development of the Higher Education system and all its constituent components, in this law was defined for the first time "quality assurance system". During 2003, Albania officially joined the Bologna process, which was fostered a process of review and adaptation of higher education curricula according to this system, the conception of ECTS and their implementation. Yet, during this period the state dominated, and university autonomy was at an insignificant stage (FRRHESR, 2014). The process of liberalisation of higher education, combined with a change of labour market circumstances, was accompanied with an increased demand for students to pursue a university education. The access to tertiary education increased significantly after 2005, with the opening of many new study programs, the development of private universities and the expansion of study programmes on part-time basis (Ekonomi et al, 2005). However, the educational policy during the period 2004-2013 brought a large and rapid licensing of universities which negatively affected students’ quality (Kajsiu, 2015). Later, reforms happening in the system during 2014-2015, brought the closure of the enrolments on part time basis, opened a process of programmes certification and halted the doctoral programmes.

Despite these important reforms, to the best of the authors knowledge, there is no study based on large scale observations, ever carried in Albania in the recent decades focused on student performance and determinant factors. Previous studies have evaluated the situation at secondary education (Shahini, 2021), provided estimates on education transition (Ekonomi, et al, 2005; De Brujin et al, 2015) or have been focused on students access to education (Zhllima et al, 2018). This paper aims to fill this gap by studying the factors that affect student performance in public university. The study is based on observations collected at Agricultural University of Tirana (AUT) (one of the largest universities in Albania) using the GRADUA platform. This platform has enrolled students from 9 universities during the last 3 years.

The paper is structured as the following. The second chapter reviews the literature. The third chapter explains the statistical methods used, followed by the fourth chapter presenting the results of the work.

1. **Literature review**

The literature offers a large variety of determinants for student performance. A part of the scholars has been focused on the transitional path from secondary education to tertiary education (Nel et al, 2009; Páramo Fernández et al, 2017). Factors related to the perceptions about the university, inadequacies and inequalities in the school system, academic, cultural, emotional adaptation and limited financial circumstances.

Other authors have focused more on the preparedness pare of the graduate during the entire learning process. One of the main determinants is student preparation and time spent for being prepared. Considering this argument, every factor that reduces time spent for preparation does also influence student performance. Hepworth et al (2018) find that student preparedness was very significant for students’ performance and students’ academic success. While excessive use of social networks has a negative impact on academic performance (Maqableh et al, 2015).

Following the argument of preparedness, students labor market engagement is important too. It creates opportunity costs for the student in terms of concentration and time spent on preparation. When employment is full-time and unrelated to the study profile the negative impact on academic performance especially, as it has a direct impact on the reduction of study hours (Sanchez ‐ Gelabert et al, 2017). Regarding working whilst studying, the best marks are obtained by students who study full-time (more notables and excellent grades). Moreover, the marks are lower for students who have full-time jobs that are not related to their degree (ibid).

The influence that personal variables, such as motivation and ability, study time (Sanchez ‐ Gelabert et al 2017) are often encountered in studies but also variables such as attendance percentage (Kassarnig et al, 2018) is an important factor. Using the case of Spain, Araque et al (2009) found that students with weak educational strategies and without persistence to achieve their aims in life have low academic performance.

A group of factors are related with students’ beliefs and perceptions. Gutierrez and Thomas (2019) explored the relationship between perceptions on teacher autonomy support, academic performance, and school satisfaction. They emphasize the importance of the possibility of self-determination during student education period as well as the importance of teaching practices that take into account students’ levels of interest in skills or learning preferences. Chamorro and Furnham (2003) found that there is a statistically significant correlation between personality traits and academic performance.

Last group of factors are students’ characteristics and family background. Alabdulkarem et al (2021) carrying a study in Saudi Arabia found that parents’ education level was a significant factor cis a vis other factors related to student previous education and engagement to extracurricular activities, including here religion. Considering successful integration to life stages as very related with students’ conditions, Islam (2014) identified a large number of factors, namely the pre-admission qualification, level of attendance, probation status, time spend in study, father’s education, parental support and involvement, major subjects of study, and gender of the students.

In some studies, current performance and future performance are related with students’ level of performance in earlier stages of education. For instance, Liem (2019) in his paper points out that knowledge of past achievements is likely to explain student performance levels to a large extent. Studies evidences in this topic differ, mainly emerging due to differing socio-economic factors influencing along countries cases, the rapid development of technology or lifestyle changes but also of the frequent changes and alterations that have undergone education systems (Alhumaid, 2019), (Francis, 2017).

Summarising, various studies have identified different factors that affect academic performance, such as socio-economic, cultural, demographic, motivation, employment during studies, etc (Yilmaz, 2009) (Islam, 2014). In addition to these changes, other demographic and social changes as well as factors related to by the higher institutions themselves may affect the quality of higher education and directly the performance of students.

1. **Methodology**

**The model**

The model is structured based on the review of the literature. The factors mentioned by scholars observing the student performance of the graduates during the entire learning process are considered when operationalizing the research.

The model uses as depended variable the students’ performance captured through the overall GPA. It is structured as a continual variable with values from 5 to 10. In order to capture the various type of factors the study analyses the factors related to student’s characteristics (gender and income) family background (parents education level) and student’s behaviours (level of class attendance, extent to which students is engaged in a working activity during university studies). Last but not least, in order to create variables that measure the evaluation of the study program, didactic materials and exams as well as motivation, exploratory analysis was used in order to group the variables into 3 factors. These factors, named as evaluation of the course, exams and study and motivation, together with the mentioned variables are presented in Table 1.

Table 1: Description of variables and hypothetical relation with the depended variable

|  |  |  |
| --- | --- | --- |
| **Type of variable** | **Description** | **Expected relation** |
| **Depended variable**  |  |  |
| University GPA | Numeric |  |
| **Independed variables** |  |  |
| High school GPA\_ | Numeric | **+** |
| Gender (F=1) | Binary (male =0, female=1) | Control variable |
| Income | Numeric, but observed in classes | + |
| Father education | Category (ordinal)1=no qualification; 2=primary-school certificate3=middle-school certificate; 4=secondary school; 5=degree (specify which one) | Control variable |
| Mother education | Control variable |
| Class attendance | Numeric, but observed in classes -25%25%-50%50%-75%More than 75% | + |
| Working activity during university studies | 1=No 2=Yes, it was an occasional, irregular or seasonal work activity3=Yes, an ongoing part-time job4=Yes, an ongoing full-time job | - |
| Evaluation of the course | Composite variable by EFA | + |
| Exams and study | Composite variable by EFA | + |
| Motivation | Composite variable by EFA | + |

*Source: Authors own elaboration*

**Data**

The data analysis is largely based on a new and unique database for Albania named GRADUA. Administrative data obtained at the Agricultural University of Tirana are also inserted in the analysis. The GRADUA database is derived from the GRADUA, which consists in a university-based platform of data exchange aimed to foster students career path by easing university monitoring of the student as well as increasing access to those actors (firms, government entities and service providers) to trace graduates with a matching profile. In order to fulfill the requirements of the University for institutional performance monitoring and institutional support for career development, the students are asked to provide information on their characteristics. A template is used for the collection of information, which consists of 6 sections namely: personal information, education and training, information on the study program, evaluation of the study program that the student is pursuing, information about the family, future intentions and prospects for their career. Filtering the information for AUT from the GRADUA Database and after a thorough cleaning of profiles with missing values, authors were able to access 500 observations. In order to have an accurate variable of student’s performance, the GPA achieved during the university studies as reported by the student, was subject to subsequent checks from the University secretary archives.

In the questionnaire students were asked to express their level of agreement regarding the statements that they are satisfied with the cooperation of staff at different levels, the study program, the appropriateness of didactic materials. In addition, students were asked to fulfil the main interest in the study program with focus on employment. More specific information on the structure and formulation of the questions is found in the table below.

Table 2: Variables use in factor analysis

|  |  |  |
| --- | --- | --- |
|  | **Variables use in factor analysis** | **Type** |
| Are you satisfied with | Teacher’s collaborators | Categorized (ordinal) variable1=no, definitely2= more no than yes3= more yes than no4= yes, definitely |
| Teachers in general |
| Teachers’ availability |
| Teaching skills of teachers |
| Administrative staff of your university |
| Timetable of daily lectures/seminars |
| Students |
| Course of study |
| How acceptable is | Overall exam organisation | Categorized (ordinal) variable1=strongly disagree2=disagree3=agree4=strongly agree |
| Didactic material |
| Workload for the classes |
| State two following reasons important to enrol in the university | Interest in the employment opportunities | Categorized (ordinal) variable1=no, definitely2= more no than yes3= more yes than no4= yes, definitely |
| Interest in the subjects |

*Source: Authors own elaboration*

**Analyses**

*The study uses both descriptive and regression analyses. In order to* explore data distribution *d*escriptive statistics were used to analyse the data as a start to explore data distribution. Linear regression analysis was used to study the influence of factors on student performance. This approach is used to model the relationship between two variables by fitting a linear equation to observed data. SPSS 19 software was used to carry the data analysis.

1. **Results**

From GRADUA data for the academic year 2019-2020, the percentage of AUT students who have not worked at all during their studies either in seasonal work, or part-time, or full-time for the academic year 2019-2020 resulted at 34% while for 2020-2021 this percentage was 23%.

The following three variables were grouped into three factors which we named F1-evaluation of the study program, F2-exams and study, F3-motivation. The cumulative percentage of variation that these three factors explained resulted in 63.891%. The Kaiser–Meyer–Olkin (KMO) measurement showed the sampling adequacy as 0,922 which was greater than 0.70, signifying that the current data was suitable for principal component analysis; The results of the tests, namely Chi-Square=11531.158; sig <0.000. Cronbach’s Alpha=0.892>0.8 are plausible arguments that the questionnaire is reliable.

|  |  |
| --- | --- |
|  | Table 3: Results of the exploratory factor analysis  |
| Nr |  | Factor 1 Evaluation of the course | Factor 2 Exams and study | Factor 3Motivation |
| 1 | Teacher’s collaborators | ,853 |   |   |
| 2 | Teachers in general | ,845 |   |   |
| 3 | Teachers’ availability | ,843 |   |   |
| 4 | Teaching skills of teachers | ,835 |   |   |
| 5 | Administrative staff of your university | ,781 |   |   |
| 6 | Timetable of daily lectures/seminars | ,660 |   |   |
| 7 | Students | ,626 |   |   |
| 8 | Course of study | ,569 |   |   |
| 9 | Overall exam organization |   | ,821 |   |
| 10 | Didactic material |   | ,762 |   |
| 11 | Workload for the classes |   | ,759 |   |
| 12 | Interest in the employment opportunities |   |   | ,830 |
| 13 | Interest in the subjects |   |   | ,827 |

*Source: Authors own elaboration*

The results of the regression analysis show a significant impact of the high school average, gender, attendance rate, motivation for choosing the study program and the adequacy of exam materials and exam organization on student performance. Female students turn out to perform better than male students. Parental education and family income don’t appear to have a significant impact on the academic achievement. Also, the degree of satisfaction with the study program does not have a significant impact on academic performance.

Table 4: Results of the linear regression analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Coeff** | **Std. Error** | **t** | **Sig.** |
| (Constant) | 4,034\*\*\* | 0,451 | 8,951 | 0,000 |
| Gender (F=1) | 0,211\*\* | 0,102 | 2,077 | 0,038 |
| High school GPA | 0,314\*\*\* | 0,041 | 7,575 | 0,000 |
| Income | -0,021 | 0,046 | -0,464 | 0,643 |
| Father education | -0,052 | 0,072 | -0,728 | 0,467 |
| Mother education | 0,054 | 0,071 | 0,750 | 0,453 |
| Class attendance | 0,130\* | 0,075 | 1,736 | 0,083 |
| Evaluation of the course | 0,036 | 0,046 | 0,790 | 0,430 |
| Exams and study | 0,135\*\*\* | 0,049 | 2,758 | 0,006 |
| Motivation | 0,080\* | 0,048 | 1,675 | 0,095 |

\* Significant at the 0.1 level; \*\* significant at the 0.05 level; \*\*\* significant at the 0.01 level.

*Source: Authors own elaboration*

In order to control for the multicollinearity problems, correlative analysis was used to assess its dependence on academic performance. Approximately, 23.1 % of students work full time during their studies while 32.7 percent had worked part time. The impact of employment on academic performance proved to be significant. The more engaged the student was in work activities during his studies, the lower his academic results (r = -0.117, sig = 0.009).

Table 5: Results of the correlation analyses between GPA and engagement in the labor market during studies

|  |  |
| --- | --- |
|  | Working activity during studies |
| University GPA | Pearson Correlation | -,117\*\* |
| Sig. (2-tailed) | ,009 |
| N | 498 |

*Source: Authors own elaboration*

1. **Conclusions**

Increasing the quality of teaching and obtaining a better learning outcome/result is a very important priority for higher education institutions. The student’s performance during his/her academic activity is influenced by many social and economic factors but also by other indicators that are related to the role of the higher education institution where students are enrolled. Many researchers highlight different factors in different countries, mostly related to the performance of the student in the past, their socioeconomic background and their current performance in the University. This paper aims to fill this gap by studying the factors that affect student performance in Albania focusing on the Agricultural University of Tirana. The analysis is based on data collected from the GRADUA platform (which provides a new and unique database on students’ performance and career expectations) as well as administrative data obtained at the Agricultural University of Tirana.

Results show that experienced high school average, but also on gender, attendance rate, motivation for choosing the study program and the adequacy of exam materials and exam organization also with significant impact on student performance. Female students turn out to perform better than male students. It was also noted that parental education and family income did not have a significant impact on the academic achievement of students at the Agricultural University of Tirana. The degree of satisfaction with the study program did not result in a significant impact on academic performance.

Results suggest that each university center could consider models to elaborate a particular action plan to help students’ efforts in fine tuning their study track and develop their career further. Students can be informed earlier on potential factors influencing their performance and results can also be inserted into the career education curricula. Information provided would bring students attention, especially to those entering in the first year, on what are the type of costs, required capacities and strategies to cope with the load created by the study programme.

Results has also practical added value. Findings help universities to adopt a holistic approach to the school-university process. It seems that class attendance monitoring is beneficial to students’ success. In order to face the current demographic constrains and the high market and financial disturbances created to current generation, the universities should pursue flexible approach for ensuring a smooth path and a successful graduation process. Labour market mismatch should be the core argument for their programming. This way motivation of the student is strengthened in the beginning of the study program, therefore raising the odds for successful performance. In addition, increasing the quality of recruitment for prospective students will make the university study path less challenging. In addition, a holistic and integrated approach at school level during the promotion period, should target especially those regions and type of schools which best match with universities programmes. This can make a difference to learners’ preparedness for university studies and consequently to their further success.

The results add value not only to the scientific literature (given the lack of similar studies) but also to policymakers. Since the study analyses only the case of the Agricultural University of Tirana, the results cannot be considered representative for the whole country. Nevertheless, results are useful for orienting other institutions of higher education, given the similarities in the socio-economic context. Other studies should be carried out in the future, using representative samples at the national level. The research should focus more on the school to university transition and explore factors that reduces the barriers being those related to students and parents’ perceptions or those related to information, over a longer time period.

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**Farmer financial education – the case of vineyards farmers in Kosovo**

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**Abstract**

One of the key factors influencing agrifood sector development remains access to finance. Literature confirms a strong association was seen between the level of financial literacy and education in several empirical studies. The paper analyzes the factors which determine farmers’ financial education, in the case of Kosovo, based on a structured farm survey focusing on the vineyard sector.  Survey analyses found that most interviewed farmers do not keep records regarding costs and incomes. Market-oriented farmers who have contracts (with buyers) are more likely to keep financial records. Findings represent important evidence for policy interventions to be carried out both on advisory services as well as financial institutions in order to strengthen financial literacy among agriculture operators and address gaps in the financial market.

**Keywords:** farmer’s financial education, cost and revenue records, Kosovo, vineyard

**JEL code:** Q12

1. **Introduction**

Kosovo is situated in the Western Balkans, with a population of 1.8 million. About half of the population lives in rural areas. Kosovo was a centrally planned economy under Yugoslavia until the late 1980s, while it underwent a notorious conflict which resulted also in heavy damage of the agriculture sector including also vineyards. Kosovo emerged as an independent country in the following decade (FAO, 2016).

Kosovo has been facing the challenges of strengthening institutions, adapting to free market economy demands, and attracting investments. The agri-food sector as a whole is facing problems with creating market institutions, establishing marketing and distribution chains, meeting EU food safety standards. The agrifood value chain is expected to change substantially in the coming years and the competition from neighboring countries will increase in the context of regional and EU integration (Xhoxhi and Imami, 2021) – that is crucial also for the wine sector given that it is very competitive.

Wine production and vineyards growing is one of the most important agri-food sectors in Kosovo in terms of production and international trade - Kosovo’s wine industry has had a strong export orientation (Miftari et al, 2021). After the conflict, there was growing interest in the sector by private business, and significant support from government and donors. The local industry is struggling to keep its presence in the export market (targeting neighboring countries, notably Albania), while growing its sales in the small but growing local market. Being a transition economy, Kosovo household income and lifestyles are changing fast implying higher demand for (quality) wine (Zhllima et al, 2020). Thus, achieving high quality not only is important to improve overall market access, but is crucial to reach higher-paying consumers who are quality rather than price sensitive.

One of the key factors influencing sector process is investments which is conditional to access to finance. On the other hand, access to finance is linked to financial literacy. Widhiyanto et al (2018) find that financial literacy is a highly important factor for credit accessibility. For instance in Kosovo, Gashi (2019) suggests that one of the factors of limited access to finance in agriculture in Kosovo is the scarce financial education of agricultural clients (capacity restriction), which jointly hampers access to finance vis a vis affordability contains and availability restrictions. Previous research has shown that financial literacy has a moderating influence on the relationship between access to finance and firm growth.

This paper analyzes the factors which determine farmers’ financial education, in the case of Kosovo, based on a structured farm survey focusing on the vineyard sector.   The literature on Kosovo is very limited. Scholars estimating financial illiteracy were focused on other groups of society. Lulaj et al (2021) observed a lack of financial behaviour to save for emergencies. Zeqiri et al (2016) studied farmers education, but neglecting financial education. Yildirim and Vardari (2020) studying the financial and mathematics literacy achievement levels found that 40% of the students stated a satisfactory level with economic students having higher levels of financial mathematical literacy knowledge than the rest. To the best of the authors knowledge, there is no study based on large scale observations, ever carried in Kosovo in the recent decades.

The study is based on observations carried on farmers cultivating vineyards in the Municipality of Rahovec. The results provide evidences on level of financial illiteracy Findings are of interest for academic institutions, policymakers and developing agencies supporting agriculture sector and wine production sector specifically.

 The paper is structured as the following. The second chapter reviews the literature. The third chapter explains the statistical methods used, followed by the fourth chapter presenting the results of the work. The conclusion in the end provide space also for recommendations for financial institutions as well as capacity building institutions.

1. **Literature review**

The literature on financial illiteracy covers different aspects. One group of studies explores the influence of financial illiteracy on credit absorption and conseguently on farmers wellbeing. For instance, Taft et al (2013) provide evidences that higher financial literacy leads to greater financial well-being and less financial concerns. On the other hand, according to Aggarwal et al. (2014) there exist a strong positive association between level of financial literacy and annual income. Same nature of relations appear also with land holding size. Furthermore Sang and Cheruiyot (2020) results shows that there exist a moderate strength of relationship with farmers’ financial education, productivity and profitability.

Other studies aim to analyse the factors influencing farmers illiteracy. Kebede and Kuar, (2015) observes based on literature review that gender, age, educational attainment, low income, and living in rural area however few studies found some demographic variables insignificant. The review suggests positive outcomes of well-designed and targeted financial education, sometimes coupled with other interventions- Akoto et al (2017) using a survey of cocoa farmers in Ghana identified as factors of financial literacy are geographical location, age and education levels. Widhiyanto et al (2018) suggest that levels of financial literacy are influenced by age, education duration, distance to the capital regency location, annual income, bank account ownership, and financial education experiences.

A strong association was seen between level of financial literacy and education in several empirical studies (Lalrinmawia and Gupta, 2015; Gaisina and Kaidarova, 2017; Aggarwal et al., 2014). However, Gaisina and Kaidarova (2017) results show that higher education does not always significantly affects the efficacy of farmers decision making about own finance, but education interlinked with experience in using financial products would derive better financial decisions.

Moreover, other sociodemographic factors associated with financial literacy and education are age, size of the population in a certain village/town and family size of the farmers (Lalrinmawia and Gupta, 2015). The level of literacy is not associated with residential location and marital status of the farmer of the farmers (ibid).

Other factors are farmers individual capabilities and their relation with banking institutions. Gaurav and Singh (2012) emphasize that farmers' education and financial experience are shown to be significantly correlated with cognitive ability. Sivakumar et al (2013) found that age, education, experience, farm income, years of relationship with the bank, size of landholding, frequency of bank visit and bank account were significantly influenced the financial literacy of farmer.

1. **Methodology**

**Sampling approach**

This paper is based on a data collected from a face-to-face survey with vineyard farmers in the municipality of Rahovec, located in southwest Kosovo. In Rahovec is concentrated grape and wine production for the whole country. After data cleaning as well as quality control, a total of 222 resulted valid observations.

**Sample characteristics**

From the descriptive statistics of the variables taken in the study it resulted that the average age of farmers was 49.5 years (SD = 12.3 years). About 43% of farmers have basic education, 37.4% with high school, 16.2% with university education, 16.2% with university education and 3.6% without education. The average area of vineyards was 1.2 Ha, while the average percentage of contribution of agriculture and livestock to the household economy was 54.3% (SD = 38.8). The main purpose of cultivating the vineyards was for sale while on average only 1.4% of the production is kept for household consumption.

Table 1: Descriptive Statistics

|  |  |  |  |
| --- | --- | --- | --- |
|  | N | Mean | Std. Deviation |
| Age | 222 | 49,5 | 12,3 |
| Vineyards area | 222 | 1,2 | 1,1 |
| Share of household income that come from farming- % | 222 | 54,3 | 38,8 |
| Distribution channels/destination as a share of total production (grape), self-consumption | 221 | 1,4 | 5,3 |

Table 2: Frequency table for variables

|  |  |
| --- | --- |
| **Household head education** | **Percent** |
| No education | 3,6 |
| Basic | 42,8 |
| Agriculture high school | 6,3 |
| Other high school | 31,1 |
| University | 16,2 |
| Total | 100,0 |

**Questionnaire structure and variables**

In the questionnaire, farmers were asked to provide data about household characteristics, farm characteristics, type of production and level of specialisation. In addition, farmers were asked to express their level of financial education by providing the. More specific information on the structure and formulation of the questions and the measurement rate of the variables to be studied is given in the Table 1.

Table 3: Study variables

|  |  |  |
| --- | --- | --- |
| **Variable** | **Question**  | **Measure of variables** |
| **Depended variable**  |  |  |
| **Notekeeping\_scale** | Keep notes for expenses and revenues | Ordinal1=never, 2=rarely, 3= sometimes, 4=often, 5=always |
| **Costing\_scale** | Calculate production costs and profit for the main product | Ordinal-1=never, 2=rarely, 3= sometimes, 4=often, 5=always |
| **Explanatory variables** |  |  |
| Age | Age | Scale |
| HH\_education | Household head education | Ordinal1=No education, 2= Basic, 3=Agricultural high school,4=other high school, 5=university |
| Vineyards\_area | Area planted with grapes in ha | Scale  |
| Share\_income\_farming | Share of household income that come from farming- % | Scale |
| Share\_selfconsumption | Distribution channels/destination as a share of total production (grape), self-consumption | Scale |
| Area\_wineyard\_share | Specialization (share of vineyard employee to total farm size) | Scale  |
| Hired\_labor | Number of working days for external (paid/hired) to total | Scale |
| Farm\_contract\_dummy | Farm contracting | Nominal1= Yes, 2=No |

**Data analysis**

Descriptive statistics and non-parametric correlation analysis were used to analyse the data. Data being not subject of normal distribution were treated using non-parametric methods. Spearman rang correlation was used for an analysis of the relationship between scale and ordinal data, also considering that the data do not meet the assumption for normal distribution. Spearman coefficient was used. In addition, Pearson correlation coefficient was calculated, covering values of each of the 2 variables. By using ranks, the quantification coefficient provided strictly monotonic relationships between 2 variables. The ranking of the data was used to convert a nonlinear strictly monotonic relationship to a linear relationship. Moreover, this property makes a Spearman coefficient relatively robust against outliers (Schober at al. 2018). The Pearson Chi square correlation coefficient was used (it is suggested to be used for nominal data), in order to observe for potential relationships between the variables having or not a contract and keeping records about expenses and income. The Chi-square was used to explore the nature of research data, as measured at the nominal level. All inferential statistics, the results suffers reliability issues, especially when the data are collected from randomly selected subjects, and when sample sizes are sufficiently large that they produce appropriate statistical power (McHugh, 2013).

1. **Results of the study**

Based on the survey analysis results, although the vast majority of farmers did not keep records or rarely kept records on expenditures or income (60% stated "never or rarely") and did not calculate costs and profits for the main product (52,2% stated “never or rarely”). On the other hand, 38.8% of the farmers stated that they kept notes often or always, and 35,2% calculated costs and profits for the main product.

Table 4: Frequency table for variables

|  |  |  |
| --- | --- | --- |
| **Alternatives** | **Keep notes for expenses and revenues** | **Calculate production costs and profit for the main product?** |
| Never | 35,1 | 41,4 |
| Rarely | 14,9 | 10,8 |
| Sometimes | 11,3 | 12,6 |
| Often | 5,0 | 5,9 |
| Always | 33,8 | 29,3 |
| Total | 100,0 | 100,0 |

*Source: Authors’ own calculation based on survey data*

Based on the correlation analysis, it was noticed that the increase in the level of education affects the increase of the chances for a farmer to keep financial notes. An important positive correlation was also observed with the variables presentence of HH income that come from farming specialization, number of working days for external to total. While a statistically significant negative correlation resulted between the percentage of consumption for household needs and the retention of financial information. This shows that the higher the percentage consumed for family needs, the lower the chances of farmers keeping records of financial information. Having a specialized farm as well as hiring off-farm staff also has a positive impact on keeping financial information. While age has no effect.

Table 5: Spearman rang correlation table

|  |  |  |
| --- | --- | --- |
| **Variables** | **Notekeeping\_scale** | **Costing\_scale** |
| Age | 0,049 | 0,052 |
| HH\_education | 0,142\* | 0,146\* |
| Vineyards\_area | 0,157\* | 0,227\*\* |
| Share\_income\_farming | 0,193\*\* | 0,244\*\* |
| Share\_selfconsumption | -0,134\* | -0,181\*\* |
| Area\_wineyard\_share | 0,146\* | 0,226\*\* |
| Hired\_labor | 0,144\* | 0,171\*\* |

\*\*. Correlation is significant at the 0.01 level (2-tailed).

\*. Correlation is significant at the 0.05 level (2-tailed).

*Source: Authors’ own calculation based on survey data*

Another factor, which serves as an incentive for a farmer to keep financial information is having a sales contract. The dependency study was conducted through the Chi-square test, which confirms that there is a dependency between having a contract and retaining financial information (Pearson Chi-Square = 20,054, df = 4, sig = 0.000). As can be seen in the table below 43.8% of farmers who have had a contract often or always keep financial records, while the percentage of farmers who have not had a contract is only 18.2%.

Table 6: Contingency table between keep notes for expenses and revenues and having a contract

|  |  |  |
| --- | --- | --- |
|  |  **Keep notes for expenses and revenues** | **Total** |
| **Never** | **Rarely** | **Sometimes** | **Often** | **Always** |
| With contract  | 61 | 18 | 21 | 10 | 68 | 178 |
| 34.3% | 10.1% | 11.8% | **5.6%** | **38.2%** | 100.0% |
| With no contract | 17 | 15 | 4 | 1 | 7 | 44 |
| 38.6% | 34.1% | 9.1% | **2.3%** | **15.9%** | 100.0% |
| Total | 78 | 33 | 25 | 11 | 75 | 222 |
| 35.1% | 14.9% | 11.3% | 5.0% | 33.8% | 100.0% |

*Source: Authors’ own calculation based on survey data*

1. **Conclusion**

Kosovo enlarging agriculture markets and increased variety of financial products has been increasing the level of financing in the agriculture sector. Complexity of financial decisions and vulnerabilities emerging from financial activities is an accompanying factor. For this reason, in the last decade, the importance of financial literacy is increasing. Most of the interviewed farmers admit that they did not keep records or rarely kept records on expenditures or income and did not calculate costs and profits for the main product. Education becomes important since, together with contract farming, it increases chances for financial discipline.

The findings contribute to strengthen the understanding of financial literacy in agriculture sector and the need to inform the design of inclusive financial systems that are sensitive to the cognitive and informational limitations of rural households. This study provides recommendations for stakeholders in the supply side as well as demand side. The finance industry as well as advisory services should return the focus on easing the integration of young farmers into capital markets.

Due to multithemed structure of the questionnaire, the variables related to financing needs and relations with financing institutions were very limited. Therefore, more should be done to explore the financial literacy based not only on statements but also behaviour.

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**“Impact assessment of subsidy schemes with machine learning – the case of the greenhouse sector in Albania”**

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**Abstract**

Greenhouse sector is the leading Albanian agrifood sector in terms of exports, and it is growing rapidly. This paper analyses the impact of budgetary support on greenhouse sector during the 2013-2018. A total of 225 farmers were surveyed during 2019 of which 98 have benefited support from the Agriculture and Rural Development Program Fund (ARDPF) and 127 non-beneficiaries. The impact is assessed using two approaches: the first one employee’s causal forest which is an adaptation of the random forest algorithm of Breiman to the problem treatment effect estimation, while in the second one genetic matching is used to match beneficiaries and non-beneficiaries on observables. The current paper contributes to the impact assessment literature by using comparative methodological analysis, by combining classical tools with latest approaches and by assessing the financial support policies (both investment and direct support measures impact in an important sector of an EU candidate country, to provide lessons learned). Results suggest that subsidies have had a positive impact on farm revenues and farm investment, but no clear significant impact is observed for employment of hired labour in farm and farmers willingness to invest in the future.

**Keywords**: subsidy schemes, impact assessment, machine learning, greenhouse sector, Albania

1. **Introduction**

Subsidy support can cause growth, improvement but also unintended negative consequences, particularly in the agriculture sector. Subsidies are necessary because they provide incentives to enable changes that cannot otherwise happen, but subsidies may also result in distortions and negative externalities (Baltzer and Hansen, 2011; Skreli et al, 2015). Therefore, it is important to assess impact of subsidies and obtain lessons learned.

There is a rich literature on the impact of support policies (eg. subsidies) - many studies focus on EU CAP, considering the high levels of support provided to EU farmers. Often the results are mixed, depending on the context, type of support scheme and the indicator taken into consideration (for more see the following section). Nevertheless, there is a common understanding that support is crucial for the agriculture and rural development - current EU agriculture sector and rural landscape is largely also a result of EU CAP.

Support for the agriculture sector is highly important for countries where agriculture sector is crucial from socioeconomic prospective (e.g. in terms of contribution to income and employment). This paper focuses on the case of Albania, which is one of the least developed European economies, and at the same time, largely relies on the agriculture sector. In the recent years’ agriculture contributed with one fifth of the country’s GVA, and around 1/3 of employed people were employed in agriculture, the highest proportion of all the countries in the region (Volk et al., 2017; FAO, 2020). For these reasons, agriculture sector is considered by the Albanian government and donor community a priority sector for socio-economic development of the country as a whole and for the improvement of the rural livelihood.

Albania is on the road to accession to the EU. In this pre-accession period, the role of agricultural and rural development policy is crucial in order to withstand competitive pressures in the farming sector in the context of the integration toward the from the EU market. The economic and financial opportunities that EU provides through accessing to the single market as well as funding are incentives but also challenges due to the need for continual adjustment of national agriculture support policies.

During 2007-2018, the budgetary support for agriculture has experienced fluctuations recording an average support value of EUR 29 million or approximately 1.5% of the sector GVA. The support is modest if compared with other WBCs and/or EU (Volk et al., 2017) where support is respectively 5% and 26% of the agriculture GVA. Thus, it is obvious that the level of funding is far below other countries in the region and EU, positioning Albanian famers in unequal position when compared to neighbouring countries. The support is also not (fully) aligned with the EU type of support. Albania does not apply decoupling support and neither area support. Moreover, direct payments (like Pillar 1) are limited only to few sectors and farm structural support (similar to Pillar 2) is fragmented and subject of frequent changes of both policy and eligibility criteria (Volk et al., 2017). The policy gaps are related to shortcomings existing in the operating supporting policy environment. Problems with land ownership insecurity, still non-operational major registers, and databases such as land and parcel register, livestock register/data base, farm register, wine cadastre, etc. represent (still pending) critical preconditions for a well-functioning scheme (Volk et al., 2017; Rama et al., 2018).

In the context of the very low level of financial support for agriculture and rural development in Albania compared to its neighbours and to EU, and weak supporting policy environment, there is a need to estimate the agriculture policy support in terms of impact and provide evidence for policy fine-tuning. This paper aims to assess the impact of Albanian government support policies on investments, farmers’ revenues, future investment plans and hired labour, using two approaches.

In the first approach the impact is evaluated with causal forests which is an adaptation of the random forest algorithm of Breiman (2001) to the problem treatment effect estimation. Whereas, in the second approach matching is used to match beneficiaries and non-beneficiaries on observables (e.g., family size, educational level, age, etc.) to make them as similar as possible. In other words, to equate (or "balance") the distribution of covariates in the treated and control groups, so that the only thing that they would differ is treatment (benefiting from the irrigation project). Then, to assess subsidy impact the average treatment effect (ATE) is estimated by regressing the treatment and covariates used during matching on the outcome of interest.

The current paper contributes to the impact assessment literature in two ways: (i) using comparative methodological analysis, by combining classical tools with latest approaches (ii) assessing the financial support policies (both investment and direct support measures impact in an important sector of an EU candidate country, to provide lessons learned.

The focus of analysis is the greenhouse vegetable, which is the leading agri-food sector in Albania. The sector has considerable export potential and based on FAOSTAT data for 2020 Albania is ranked 52nd out of 135 countries in terms of tomatoes exports. Moreover, the greenhouse vegetable sector has been considered a priority sector for support from government.

The remainder of the paper is structured as follows. The second section provides a literature review, the third section describes methods employed to assess the impact. The main results from the quantitative analysis of the impact assessment are presented in the section four, while section five concludes the paper.

1. **Literature review**

The effect of subsidies on technical efficiency remains an open empirical question. Kumbhakar and Lien. (2010) emphasise that theoretically, an increase in coupled subsidy payment will reduce farm productivity if it provides an incentive to farmers to use less input but may create a positive influence if the subsidies provide farmers with an incentive to innovate or switch to new technologies. An additional debate rests on the share of subsidies to overall incomes. If subsidies increase being a certain level farmers prefer more leisure time with a higher share of income from subsidies. The latter, is not an issue of concern for developing countries, considering the limited budgetary support provided as a share of GDP compared to developed countries.

There is a growing body of literature on the impact of support policies (eg. subsidies) all over the world. Major part of studies aims to estimate the impact of schemes after a certain reform. Considering the type of schemes are differing between sectors and between countries and since major part of them have been in continual change, it is difficult to make a review of their findings using a common framework.

Many studies focus on EU CAP, considering the high levels of support provided to EU farmers. For instance, several direct schemes were used in EU in early 1990s. However, during the last 20 years, agricultural policy in EU has aimed at reducing price support and orienting support policies toward non-product-specific support (depending on acreage and herd sizes, but not on produced volume) and decoupled payments (not related to the production at all). Coupled voluntary support still exist and is supposed to compensate for cost disadvantages existing in areas with natural constrains. Headage payments were differentiated according to countries orientation while farmland acreage payment is transformed into decoupled support. Then later, after the reforms of 2000, most schemes were transformed into decouple schemes. Therefore, the debate of the economics on the impact of schemes is based frequently in a contrasting context.

Kumbhakar and Lien (2010) emphasise that both coupled and decoupled subsidies can have an impact in prices, incomes, and labour. They can change the relative prices of inputs and outputs, changing the level of incomes and thus altering the labour distribution and investment decisions, thus influencing farm growth and exit. McCloud *et al*. (2008) suggest that subsidies drive productivity through efficiency and input productivities.

Some studies shows that a higher degree of coupling in EU CAP farm support negatively affects farm efficiency (Zhu and Milán, 2012). On the other hand, Kazukauskas et al. (2013) found that policy changes in terms of de-coupling happening in 2001-2007 has created conditions for dis-investments and exit out of agriculture. Similar findings were found also by Latruffe et al (2011) in all countries considered except Denmark. Lakner (2009) also found that the agri-environmental payments show a negative effect on efficiency. A third group of authors disregard the type of schemes while focus on changing patterns in the farm. Empirical research has shown that the composition of subsidies has a much smaller effect on efficiency than does the composition of total farm income (Zhu and Milán, 2012).

An important area of studies focuses on analysing the impact of EU CAP on income levels. Early analyses of Frawley and Keeney (2000) show that payments in the disadvantaged areas were the most effective measures in favouring income distribution equity. Other schemes, not directly related to incomes revealed that cross-compliance schemes (REPS and extensification) had a more moderate effect in terms of equity while the arable aid payments contributed least to farm income equity. Severini et al. (2016) show that the income stabilizing role of direct payments increases as the share of direct payments in total farm receipts increases. Bojnec and Ferto (2019) found for the case of Hungary and Slovenia that CAP subsidies represent a stable source of farm income, are increasing the level of farm income, but are not stabilising farm income. CAP subsidies contribute to stabilising farm income mainly because they are less variable than the remaining sources of income and thus mitigate the variability of farm income over time, however they are less likely to serve as an efficient tool for stabilising it. In addition, income losses and land abandonment were witnessed with the introduction of agri-environmental schemes (Acs et al, 2010).

Subsidy schemes are expected to affect farm investment. Indeed, there are not many studies on investments effects. Reise *et al*. (2012) found that German farmers investment decisions are mainly driven by capital costs and the subjective perception of the risk resulting from the investment. In addition to capital costs which are addressed by subsidies, bounded rationality is an important factor. Authors analysed the influence of an investment subsidy, only about half of the amount of the subsidy, is reflected in an increased willingness to invest. O’Toole and Hennessy (2015) found that decoupled subsidies do reduce credit constraints.

Another area of interest is the impact of support schemes on employment. Studies investigating the impact of subsidy schemes on employment are limited. Olper et al. (2012), found that CAP has positively affected job creation in agriculture were direct payments where twice beneficial compared to other payments. Storm *et al.* (2013) found that higher direct payments of neighbours’ decrease own survival probability and thus affect the employment.

Studies exploring the impact of subsidies include in the analyses additional explanatory variables in the inefficiency model. Zhu and Demeter (2012) included farm size, specialization, labour use, land use, financial management, and geographical regions as explanatory variables. The relation between farm size and farm performance is an old debate related with diseconomies of size. The degree of specialization is also an issue of concern. Some studies consider the share of incomes from a certain crop, while others the share of area from a certain crop which is more important for the main product of the farm. Acording to Latruffe *et al*. (2011) the specialisation accounts for any advantages related to more knowledge in a single production activity, which could positively affect farm performance. In other cases, specialisation may reduce the efficiency of production in low capacity to adapt to market changes.

In the case of Albania, there are a few studies on impact assessment of subsidies. Skreli et al. (2015) analyzed the impact of government subsidy schemes on farm production capacity, technical efficiency, and use of idle production factors (land and labour) in olive and vineyard sectors of Albania, using Propensity Score Matching (PSM) Method. Results show that government subsidy scheme had a clear net impact on increasing areas under fruit plantation in Albania, but not on farm size, employment, and crop yield level. Gecaj et al. (2019), using both PSM and the veteran approach shows that that subsidies have affected the planted area in the year when they are obtained, and partially the yields, but have no impact on price (proxy for quality) for Medicinal and Aromatic Plants. There has not been carried out study on impact assessment of support schemes in the livestock sector in Albania, despite its importance on agriculture output, food security and rural livelihood

1. **Data and methods**

The analysis of the impact of subsidy schemes in the greenhouse vegetable sector is based on data from n = 225 farmers. Of which 98 have benefited from subsidy schemes during 2013-2018 and 127 have not benefited. Table 1 presents some sample characteristics for the beneficiary and non-beneficiary groups. The shaded columns are the exploratory variables (i.e., variables that are used for matching), the non-shaded columns are the outcomes of interests for assessing the impact.

**Table 1**: **Sample characteristics**

|  |  |  |
| --- | --- | --- |
|  | **Beneficiaries (N=98)** | **Non-Beneficiaries (N=127)** |
|  | **Mean** | **Std.Dev** | **Mean** | **Std.Dev** |
| Farmers' Age | 50.99 | 10.67 | 44.54 | 11.98 |
| Farm size area | 16.89 | 15.27 | 13.22 | 13.25 |
| Farmers' Education | 10.82 | 2.17 | 10.44 | 2.28 |
| Family size | 4.91 | 1.39 | 4.82 | 1.31 |
| Keep notes & Calc. prod cost (Y/N) | 50% | 0.5 | 56% | 0.5 |
| Registration with Tax authorities (Y/N) | 10% | 0.3 | 12% | 0.32 |
| Intermediary advice (Y/N) | 32% | 0.47 | 20% | 0.4 |
| Revenues from the main 2 products (ALL) | 17,591,633 | 15,662,790 | 12,192,480 | 10,409,663 |
| Total Greenhouse revenues (ALL) | 20,097,245 | 12,751,006 | 14,521,102 | 10,956,211 |
| Farm investment 2013-2018 (ALL) | 19,944,388 | 24,616,148 | 11,340,945 | 13,302,329 |
| Plans to invest in the next 5 years (ALL) | 11,568,367 | 26,669,422 | 5,692,913 | 16,619,701 |
| No Hired workers | 2.17 | 3.05 | 1.43 | 2.14 |
| Greenhouse area (dynym\*) | 6.15 | 5.44 | 4.08 | 2.74 |

Note: dynym is 0.1 Ha; Y/N 🡪 the answer is a yes or no and the mean value shows the share of respondents that have answered yes; ALL 🡪 Albanian Lek (old format – has one more zero) – 1 ALL ~ 0.000816 (exchange rate 18/7/2021)

To assess the subsidy scheme impact two approaches are employed. In the first approach the impact is evaluated with causal forests which is an adaptation of the random forest algorithm of Breiman (2001) to the problem treatment effect estimation. Whereas, in the second approach matching is used to match beneficiaries and non-beneficiaries on observables (e.g., family size, educational level, age, etc.) to make them as similar as possible. In other words, to equate (or "balance") the distribution of covariates in the treated and control groups, so that the only thing that they would differ is treatment (benefiting from the irrigation project). Then, to assess subsidy impact the average treatment effect (ATE) is estimated by regressing the treatment and covariates used during matching on the outcome of interest.

Here causal effects are defined via the potential outcomes model (Imbens and Rubin, 2015): For each sample *i*, is assumed that the potential outcomes *Yi*(0) and *Yi*(1) corresponding to the outcome we would have observed had we assigned control or treatment (W) to the *i*-th sample, and assume that we observe *Yi = Yi(Wi).* The average treatment effect is then defined as $τ=\left[Y\_{i}\left(1\right)-Y\_{i}\left(0\right)\right]$, and the conditional average treatment effect function is $τ\left(x\right)=\left[Y\_{i}\left(1\right)-Y\_{i}\left(0\right)|X\_{i}=x\right]$. In order to identify causal effects, we assume unconfoundedness (i.e., that treatment assignment is as good as random conditionally on covariates (Rosenbaum and Rubin, 1983).

Here the casual forest estimation is done through the grf R package, which starts by fitting two separate regression forests to estimate $\hat{m}\left(∙\right) $ (main effect function) and $\hat{e}\left(∙\right)$ (propensity function). It then makes out-of-bag predictions using these two first-stage forests and uses them to grow a causal forest (see equation 7 in Athey and Wager, 2019). Then casual forest is trained and its parameters (e.g., min node size) are tuned by cross-validation (i.e., the parameters that minimize the objective function are selected). In addition, to improve precision as suggested by Athey and Wager (2019) first a pilot random forest is trained on all features (not all are presented here), and then train a second on only those features that saw a reasonable number of splits in the first step. Given good estimates of Y.hat and W.hat, this approach eliminates confounding effects (see Zhao *et al*. (2017) for a further discussion).

On the other hand, the second estimation procedure of the impact of subsidy schemes that relies on matching employs genetic matching, which uses a search algorithm to iteratively check and improve covariate balance (see appendices for covariate balance pre and after matching), and it is a generalization of propensity score and Mahalanobis Distance (MD) matching (Rosenbaum and Rubin 1985). It is a multivariate matching method that uses an evolutionary search algorithm developed by Sekhon and Mebane (1998) to maximize the balance of observed covariates across matched treated and control units.” (Diamond and Sekhon 2013). Then, to assess subsidy impact on an outcome the average treatment effect (ATE) is calculated by regressing the treatment and covariates used during matching on the outcome of interest.

1. **Empirical results**

Table 2 presents the results of both estimations procedures. Even though, there are differences in the estimates generated by the two approaches, they both show results that are in the same direction. As can be seen the subsidy scheme in the greenhouse sector appear to have increased revenues for beneficiaries considerably compared to non-beneficiaries. Also, farm investment of those that have benefited from subsidy schemes are significantly higher than non-beneficiaries. On the other hand, subsidy schemes have not affected employment of hired labour in farms and farmers willingness to invest in the future.

**Table 2**: **Estimation of the ATE with casual forest and genetic matching approach**

|  |  |  |
| --- | --- | --- |
|  | Casual ForestATE & 95% CI | Genetic MatchingATE & 95% CI |
| Revenues from the main 2 products (ALL) | 4,484,740 +/- 3,443,882 | 7,085,093 +/- 4,853,790 |
| Total Greenhouse revenues (ALL) | 5,169,098 +/- 3,023,112 | 8,985,871 +/- 3,760,532 |
| Farm investment 2013-2018 (ALL) | 8,451,330 +/- 5,163,802 | 6,124,315 +/- 6,008,942 |
| Plans to invest in the next 5 years (ALL) | 4,355,507 +/- 5,498,310 | 7,528,749 +/- 5,783,458 |
| No Hired workers | 0.592 +/- 0.672 | 0.664 +/- 0.78 |
| Greenhouse area (dynym) | 1.734 +/- 1.052 | 0.835 +/- 0.77 |

 Note: dynym is 0.1 Ha; Albanian Lek (old format – has one more zero) – 1 ALL ~ 0.000816 (exchange rate 18/7/2021)

1. **Discussion and conclusion**

This paper assessed the impact of governmental budgetary support on greenhouse farms productive factors such as labour and investments, and farm revenues. The impact is assessed using two approaches: causal forests which is an adaptation of the random forest algorithm of Breiman to the problem treatment effect estimation and a matching on observables.

The findings show no impact of NSS on farm external employment/hiring. While, Albanian farms/rural households, typically used to suffer from underemployment, this is not the case nowadays where due to emigration finding labour force in rural areas have become increasingly difficult. Thus, any intervention under such conditions has limited impact on increasing hired labour (i.e., there almost no free labour in rural areas)

NSS has positive impact on greenhouse area, farm investment and farm revenues. Indeed, subsidies implies higher income and enable increase greenhouse size (since on one hand, the farmer has more financial resources to invest in expanding greenhouse area, and on the other hand, has one more incentive, since subsidies are provided to change the greenhouse plastic cover). No impact on plans to invest in future was observed. The current study results converge with Skreli *at al*. (2015) and Gecaj *et al*. (2019) in terms of positive impact of government support on production capacities (e.g., planted area in the case of horticulture sector) and no impact on labour. The later may result from the fact, that most subsidies scheme, such as those applied to the greenhouse farmers, are not linked to or conditioned with technology transfer or improving access to advisory services.

The results of the study urge for a revision of the financing mechanism being offered to greenhouse farms in the future in Albania. NSS should reformulate support priorities, support measures, and eligibility criteria in the future. For example, greenhouse requirement of above 2.8 meters height as a requirement to receive subsidies for plastic cover is considered as not realistic given that only a small proportion of farmers have currently this type of greenhouse.

The Ministry of Agriculture should provide an increase overall level of funding in order to respond to sector’s needs. The provision of investments grants has been scarce due to shortage of funds. Policy makers should combine financial support with information, capacity development instruments, and innovation. Quite often, the problem might not be the lack of funding, but the lack of information and capacities both at individual business and at value chain level. Access to markets, better quality, contract farming and support to product and business development should be enabled vis a vis an increased funding.

The subsidy support for greenhouse plastic cover change has limited absorption due to this eligibility criterion. In addition, lack of transparency has broken the farmers trust in institution leading to limited application for the scheme. Given the impact on greenhouse area, investment and farm revenues, government should simplify and expand the support by revising the eligibility criteria. The support should be provided based on cross-compliance requirements in order to contribute to other farm performance indicators.

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1. **Appendices**



**Table 3: Sample imbalance statistics**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Prior to Matching | After Matching |
|  | **type** | **statistic** | **L1** | **statistic** | **L1** |
| Farmers' Age | (diff) | -6.45 | 0.00 | 0.14 | 0.00 |
| Farm size area | (diff) | -3.66 | 0.01 | -0.58 | 0.00 |
| Keep notes & Calc. prod cost (Y/N) | (diff) | 0.06 | 0.06 | 0.00 | 0.00 |
| Registration with Tax authorities (Y/N) | (diff) | -0.02 | 0.02 | 0.00 | 0.00 |
| Family size | (diff) | -0.09 | 0.06 | 0.00 | 0.00 |
| Farmers' Education | (diff) | -0.38 | 0.26 | 0.00 | 0.00 |
| Intermediary advice (Y/N) | (diff) | -0.12 | 0.12 | 0.00 | 0.00 |

Note: Prior to matching – Multivariate Imbalance Measure: L1=0.885 & Percentage of local common support: LCS=6.6%; After Matching – Multivariate Imbalance Measure: L1=0.508

Percentage of local common support: LCS=30.4%

1. Snowball sampling (or referral sampling) is a non-probability sampling technique where existing study subjects recruit future subjects from among their acquaintances. Thus, the sample group appears to grow like a rolling snowball. As the sample builds up, enough data are gathered to be useful for research. This sampling technique is often used in hidden populations which are difficult for researchers to access – in our case there is no database of experts, wholesalers and traditional (e.g., green vendors) retailers by type, based on which one can draw random sampling. However, in the case of processors and supermarket chain, the aim was to target the largest operators. Some interviews can provide information for more than one value chain. [↑](#footnote-ref-1)
2. Tomato is the main vegetable produced in greenhouses and the main vegetable which is exported. [↑](#footnote-ref-2)