Land Market Development and Agricultural Production Efficiency in Albania

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1. Introduction[♣]

During the past decade, Albania has achieved macro-economic stability and made significant progress in implementing structural reforms. Albania has been one of the most aggressive countries in introducing a market-based reform since the beginning of the nineties. Despite impressive achievements in terms of GDP rate of growth, and macroeconomic stability in the last 15 years, Albania remains one of the poorest countries in Eastern Europe with a per capita income estimated at 2439 USD in 2004 (WDI, 2006).

At the time of its implementation, the agrarian reform was on the top of the reform agenda because of the difficult food situation of the country and the importance of agriculture in the economy. Agriculture accounted for more than 50 percent of GDP and employed half of the country's labor force with 65 percent of the population being rural. Land reform, in particular, was a necessary condition to agriculture growth, for restructuring agricultural enterprises, privatizing land, and promoting individual farming.

Some argue that the higher growth has been largely fueled by the reallocation of resources from low productivity sectors like agriculture to high productivity sectors (services, construction). In 2004, services accounted for more than 50 percent of GDP and agriculture only 25 percent. Despite the sector's share tot total GDP has decline, agriculture growth rate, however, have been the highest in Europe.

There may be still extensive opportunities in the sector of agriculture and that their utilization would help to stabilize or increase the growth rate of this sector. Whether agriculture can offer a future to the residents of Albania and the extent to which land markets can help overcome large differences between the ownership and the operational distribution of agricultural land are two issues of considerable interest In most of the transition countries, despite a clear evidence of land markets activity, the level of land sale and rental market is lower than one could expect after the transition. The direct consequence is that land transactions are rare and the farm household cultivates directly their land endowment (Lerman, 2002). Having land markets transfer land to more productive producers can help to improve not only efficiency but, giving land owners better rents for the land they own, also equity (Deininger, Sarris and Savastano, 2004).

To assess the functioning of land rental markets and explore efficiency- and equity impacts of land rental restrictions, we use a model of producers who differ in endowments and skills and who face imperfect labor markets and transaction costs -further increased by policy-induced restrictions- in the land market (Deininger and Jin, 2006)

We make use of data from the 2005 Albania Living Standard Measurement Survey to investigate what are the factor markets constraints that affect the functioning of land markets, technology adoption, agriculture productivity and to verify how the elimination of these limitations may help to reach higher rate of growth in the agriculture sector and better level of wealth among rural population. Low level of mechanization, the partition of the land into very small plots, the absence of land rental market, the lack of

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rural infrastructure, and the low level of credit for this sector may hamper modernization of the agriculture sector and its productivity.

In order to understand what are the factors affecting agriculture production and land market development, we will analyze stochastic frontier estimate to compute a measure of producers' ability to assess the productivity-impact of land rental and sale market. We will complement the study with the analysis of rental and sale market participation to assess whether land market can help to increase efficiency and overall equity. To do so we undertake two different empirical estimation procedures: a multinomial logit, and an ordered probit to verify that results are not dependent on arbitrary information.

The structure of paper is as follows: The next section reviews the history of land Reform in Albania. Section three and four review the relevant literature and derives the conceptual framework underpinning the empirical work in the paper. This is followed by descriptions of the data and the statistics for rural household involved in agriculture activities and specific information on rental and sale market. A subsequent section outlines the empirical analysis for technical efficiency and land market participation. The last section provides conclusions and implications.

2. History of Land Reform in Albania

During the past decade the countries of Central and Eastern Europe (CEE) and the Commonwealth of Independent States (CIS) of the former Soviet Union have faced important land policy reforms.

The large-scale collective and state farms that used to be the building block of the former socialist agriculture have been replaced by new forms of farm organizations. The process of privatization aimed at transferring land to private owners, and at increasing effectiveness of land use by eliminating the hereditary inefficiency of the socialist large-scale farming organizations.

The modality of transformation of agricultural production from large scale to individual farms varied across countries and between regions (Mathijs and Swinnen, 1998). Land privatization has been realized differently: restitution or distribution to former farm workers and farmers for the case of collective farms and mixed methods as leasing and sales for the state farms.

For example, Albania and Romania have experienced land distribution to former farm workers and farmers, and therefore private farmers are the dominant form of farm organization that resulted after the reform (Mathijs and Swinnen, 2000, Sarris and Deininger, 2002).

In other countries such as Bulgaria, Czech Republic and Hungary where land was restituted to former land owners, a consistent part of farm land is operated by former cooperatives and restructured state enterprises. The result, in some cases, has been a separation of land ownership from use, and a high proportion of rented land.

Before the independence from the Ottoman Empire, land property was organized in *çiflik et timar* (Civici 2001). At the beginning of the *timareve* regime, land was given by the government as a form of reward to a *spahinj* (chevalier) of a region entitled to control military the region. Under this military system,

the chevalier had a temporary right to use the land, to inherit it without the real property right. They could give some plots (*çiflik*) in use to farmers under specific rules and without guaranteeing any kind of right apart inheriting. There was not a real property right regime and later on, after the military system, the word *çiflik* end up meaning a large feudal property encompassing land of different villages (Civici 2001).

Therefore, before World War II and after the independence from the Turks, in 1912 the first Albanian state inherited a land system based on *latifundia* with unequal distribution of land. . Agriculture land was under the monopoly of few families besides the attempt of reforming the sector and an emergent functioning of land market.

The first Land Reform in Albania took place with the 1945 Agrarian Law. The state started a process of elimination of private ownership of property. Land was confiscated from large landowners and distributed to landless or owner of small plot. Later, farmers were forced to organize in agricultural production cooperatives (APC) and state farms were established.

By 1970 the final stage of collectivization resulted in the nationalization of all land, and almost all agricultural land was either part of a cooperative or a state farm. In 1976, the Socialist Constitution declared all property under state ownership, thereby eliminating even the small amount of land under private ownership (Kelm, 2002; Cungu and Swinnen, 1999). During this process, the management of the agriculture sector was oriented in achieving self sufficiency more than focusing on comparative advantages and efficiency. This process ended in dramatic productivity losses, food shortages and a severe declining in the welfare of the population.

Inefficient and superficial reforms were implemented during the ‘80s. The economic system was characterized by the hereditary economic inefficiencies and the misallocation of the resources. This resulted in a growing dissatisfaction of the population that culminated with the denouncement of the government. The Communist Party declared its intention to implement democratic and market economy principles. This process, however, was superficial and without legal basis.

Borrowed by the Hungarian Reform of the late sixties, the Albanian “New Economic Mechanism” of the early ‘90ies was supported by some minor microeconomic reforms that were intended to decentralize and liberalize the management of the enterprises, and at establishing private marketing for most agriculture product. Farmers, in addition, received small parcel of land and some animals for farming. This reform, however, was characterized by a high degree of uncertainty especially for what concerned the allocation of property rights over assets. Any gain in productivity and efficiency as a whole was reached and farmers were more concentrated in extracting revenue from their land and livestock than from working for the state farm or APC.

The collapse of the agriculture sector was a reality at the beginning of the ‘90s, and Albania was depending on food aid. Political instability and social disorder remained throughout 1990 and 1992 followed by a decrease of the GDP and collapse of the industrial sector and of the economy as a whole. Starting in 1991 there was a general consent on the need of economic reform based on private ownership. New elections were called for in 1991 and subsequently the privatization of property started.

With the Law 7501 started the process of the mere land distribution on an equal per capita basis to member families and rural residents. Each family received equal amounts of arable land, fruit trees, vineyards and olive trees.

The overall framework for privatization was established by Law 7512, On Sanctioning and Defending Private Property, Free Enterprise, Private Independent Activities, and Privatization (August, 1991). A significant policy decision of the Albanian Government is stated in this law: *"All sectors of the economy are opened to private activity including state-owned institutions and other units, with all of the following fields of activity being converted to private property; industry, handicraft, agriculture, building, transportation, banking services…etc."*

The Law 7501 *On Land* implemented a process of distribution of ownership and use rights. Families living in the ex-cooperatives were given ownership rights free of charges, whereas families working on state farms received use rights (Kelm et al., 2001). By the end of 1992 all cooperatives were dismantled (about 87%), and livestock, orchards, fruit trees were also distributed to farm workers.

The process of privatization of state farms was slightly different: there has been either distribution to former specialists and workers or pooled in join ventures with foreign capital. The reason for the latter case was to reserve land for foreign investment. However, this original intention was abandoned by the government after realizing that foreign investors would have replaced labor force with a mechanization process. Workers of previous state farms enterprise were given ownership rights with the implementation of the Law 8053*, For Transferring Ownership of Agricultural Land without Compensation* (December 1995). The law converts use rights to ownership rights provided that the land has been used properly and is neither subject to tourist development nor national experimental or scientific use.

The Law 7501 does not recognize the pre-collectivization ownership and in order to avoid the opposition of the pre-45 owners the Law 7699, *For Compensation in Value for the Former Owners of Agricultural Land* (April, 1993) allows for compensation in cash, state vouchers or with alternative land, for example land in tourist areas. Although claims have been filed, there has been little success with the compensation program.

The Local District Land Commissions were entitled to direct the process of land distribution, and the main criteria were the quality of the land, irrigation, the slope and the household size.

Despite its general political consensus, the law on land distribution engendered many sources of problems. Among others, conflicts over land by original owners, who wanted their property back, is still a dominant factor. As a result, a law in 1995 was introduced by the Parliament in order to compensate former landowners giving them the land in coastal region with high potential for tourism.

Then, conflicts over village borders are also relevant. The root of this kind of conflict is to be attributed to the consolidation of agriculture cooperatives that took place in the seventies, when different villages were incorporated into one cooperative. After the privatization process, land was restituted to village, and the land commission was responsible to divide borders in order to ensure equal per capita

amount of land between villages. This process has caused many conflicts among neighboring villages (Baku, 1997).

The Law *On Land* initially prohibited land transaction through sale market. The 1995 Buying and Selling Law set complicated procedures that made land sales difficult to realize. In April, 1998, Law 8337, *On the Transfer of Ownership of Agricultural Land, Forests and Pastures*, (April, 1998) simplifies procedures for transactions making a land market for agricultural land more viable. However, the land still prohibited foreign ownership of agriculture land. This law introduced regulation on the documentation required for the transaction of land, therefore protecting the rights of family members. The documents required for land transaction are a certificate of civil status by the head of the family accompanied by a notarized power of attorney by all adult members enabling the head of the family the right to complete the transaction on their behalf (Kelm et al., 2001)

For what concern the rental market activity of state owned land, the Parliament approved Law 8318, *On Leasing of State Agricultural Land, Forests, Meadows and Pastures* (April 1998*)*. Article 1 states that "*This Law entitles state to lease the land under its ownership, to physical or juridical persons who may be both nationals or foreigners*" for periods of 10, 30 and 99 years. The leasing auction and the decision making process is under the supervision of a board made up of agricultural, forest, urban, environment and specialists and lawyers who resolve the technical requirements foreseen by this law for leasing land (art. 13) and impede that public investments are implemented during a period of 10 years. There is no mention of the possibility for a tenant to transfer this right so it is assumed that this right does not exit also within the family. If a tenant decides to resign the lease, the Board is informed and a new auction to lease the land will be conducted.

The main results of land reforms are (Cungu and Swinnen, 1999):

- a private production system,
- a complete break down of state farms and cooperatives,
- fragmentation of land ownership and use,
- growth in agriculture production starting in 1992.

Although land distribution is complete and all state farms and cooperatives are have been transformed in individual farms, the process of land titling was slower and not fully realized. Individual farming has resulted in an important problem of plot fragmentation of land use. More than 95% of agriculture land is used by 490000 individual private farms divided in 1.9 million separate parcels (Congu and Swinnen, 1999). The average number of plot cultivated by each family is 3.3 and the average far size is 1.0 ha. Agriculture production has increased considerably from 1992 with an annual rate of 10% until the end of the '90s which represents one of the best performance among the countries of Central and Eastern Europe In addition to that the restructuring process was lacking monitoring and resulted into inequitably distribution of cooperative's assets: machinery, fruit trees, farm equipment were either simply grabbed or were sold at very low prices (Civici, 2000; Daku, 1997).

To be noted that despite the privatization process distribution of ownership rights started in 1991, the legal recognition of private property, started only in 1998, with the approval of the Albania Constitution

(October 21st, 1998). Article 11 of the Constitution states that "the economic system of the Republic of Albania is based on private and public property, as well as on a market economy and on freedom of economic activity". Also, Article 41 declares that "The right of private property is guaranteed" and "Property may be gained by gift, inheritance, purchase or any other classical means provided by the Civil Code". The legal recognition started only seven years after the agricultural privatization process. This has caused the land market to be still at an embryonic phase given that farmers are recognized their rights only in the last 10 year. This may be an explanation to the fact that both rental and sale market, in Albania, are so underdeveloped.

3. Conceptual framework

3.1. Theoretical model

We make use of a conceptual model developed by Deininger, Jin, and Nagarajan (2007) to derive a theoretical model on households' rental market participation. According to their model, household *i* be endowed with fixed amounts of labor ($\overline{L}_i$) and land ($\overline{A}_i$), and a given level of agricultural ability (α_i). Agricultural production follows a production function $f(\alpha_i, l_{i,a}, A_i)$ with standard properties, i.e. $f'>0, f''<0$ with respect to all arguments and $f''_{lA}>0$.[1] Relative land scarcity, together with the cost of supervising labor (Frisvold, 1994) makes wage-labor based cultivation undesirable in equilibrium (Binswanger et al. 1995), implying that households allocate their labor endowment between farming their own land ($l_{i,a}$) and off-farm employment ($l_{i,o}$) at an exogenous wage (w_i). Renting of land incurs transaction costs TC^{in} for renting-in and TC^{out} for renting-out because of the need to obtain information on market conditions, to negotiate and enforce payments, and the presence of regulations that restrict transferability or completely outlaw certain contract types. We assume transaction costs to be proportional to the size of land transferred allow households to structure rental contracts in a way that allows those lacking liquidity to enter into arrangements to allow them to defer rental payments until the harvest. With this, household *i*'s decision problem is to choose A_i, $l_{i,a}$ and $l_{i,o}$ to solve

$$\underset{l_{i,a}, l_{i,o}, A_i}{Max} \; pf(\alpha_i, l_{i,a}, A_i) + wl_{i,o} - I^{in}[(A_i - \overline{A}_i)(r + TC^{in})] + I^{out}[(\overline{A} - A_i)(r - TC^{out})] \qquad (1)$$

$$\text{s.t.} \qquad l_{i,a} + l_{i,o} \leq \overline{L} \qquad (1a)$$

$$l_{i,a},\ l_{i,o},\ A_i \geq 0 \qquad (1b)$$

where p is the price of agricultural goods, r is the rental rate, A_i is the operational land size, I^{in} is a indicator variable for rent-in (=1 for rent-in, 0 otherwise), I^{out} is an indicator for rent-out (=1 for rent-out, and 0 otherwise), TC^{in} and TC^{out} are transaction costs, and all other variables are as defined above. Assuming

[1] Note that, $f(\alpha_i, l_{i,a}, A_i)$ is subject to constant return to scale. For example, in the Cobb-Douglass case, $f(\alpha_i, l_{i,a} A_i) = \alpha_i^{1-\beta_1-\beta_2} l_{i,a}^{\beta_1} A_i^{\beta_2}$. As ability is not tradable, $f(l_{i,a} A_i) = l_{i,a}^{\beta_1} A_i^{\beta_2}$ is subject to decreasing return to scale in land and labor (Conning and Robinson 2005).

that the restrictions in (1a) hold with equality, the optimal choices of $l_{i,a}^*$, $l_{i,o}^*$ and A_i^* will solve the first order conditions (FOC) of problem (1), i.e.

$$pf_{l_i,a}(\alpha_i, l_{i,a}, A_i) = w \qquad (2)$$

and for households who rent in ($A^* > \overline{A}_i$), $\quad pf_{A_i}(\alpha_i, l_{i,a}, A_i) = r + TC^{in}$ (3)

and for households who rent out ($A^* < \overline{A}_i$), $\quad pf_{A_i}(\alpha_i, l_{i,a}, A_i) = r - TC^{out}$ (4)

and for autarkic households ($A^* = \overline{A}_i$), $\quad r - TC^{out} < pf_{A_i}(\alpha_i, l_{i,a}, A_i) < r + TC^{in}$ (5)

Derivation and solution of the first order conditions allows us to derive demand functions for labor and land and leads to three propositions that can provide the basis for the empirical tests (Deininger, Jin, and Nagarajan, 2007):

First, the amount of land rented in increases in ability, α, decreases in land endowment A, and increases in endowments with (or access to) machinery. The opposite holds for the amount of land rented out. This implies that rental markets will transfer land to "poor but efficient" producers, subject to the functioning of other markets. Agriculture ability can be proxy by farmers' technical efficiency that can be estimated either by parametric and non parametric approaches such as stochastic frontier or data envelopment analysis.

Second, transaction costs drive a wedge between what is paid by households renting in land and what is received by those renting out. In fact, for any w and $TC^{in} > 0$ or $TC^{out} > 0$, there are two critical values of α, α_L and α_U such that households with ability α_i lower than α_L will rent out land, those with $\alpha_L < \alpha_i < \alpha_U$ will remain in autarky, and those with α_i above α_U will rent in land. It is easily seen that any increase in T will decrease α_L and increase α_U, thereby expanding the range of producers who remain in autarky, reducing the number of households who participate in rental markets and the amount of land transacted in these markets. Conversely, any reduction in transaction cost will thus increase land transactions, and since this enables more farmers to achieve their optimal land size, leads to a direct increase in production and social welfare.

A third prediction is that better off-farm opportunities, as represented by the wage rate *w*, will contribute to an independent increase in the amount of land transacted in rental markets. Since such a step would transfer land from less to more productive producers, it is likely to be associated with an increase in overall productivity and thus welfare in the rural economy. It can be shown that, under fairly general conditions, expansion of off-farm opportunities will be associated with a decrease in equilibrium rental rates which, at least in a risk-free environment, will make everybody better off

4. Empirical implementation

4.1. Stochastic frontier and technical efficiency

Since the pioneering work by Farrell in 1957, which drew upon the works of Debreu (1951) and Koopmans (1951), a considerable effort has been directed at refining the measurement of technical efficiency. The literature on efficiency analysis is broadly divided into deterministic and stochastic frontier methodologies. The deterministic, nonparametric approach that developed out of mathematical programming to measure efficiency is known as data envelopment analysis (DEA), while the parametric approach which uses a stochastic production, cost, or profit function to estimate efficiency is called the stochastic frontier approach (SFA).

Both approaches allow defining an efficiency index which measure the distance of each farm from a point on the production or cost frontier. The degree of inefficiency of each farm is represented by the distance by which each farm lies below its production function or above its cost function. Technical efficient farms lie on the production frontier whereas the level of inefficiency of other farms with the distance from the production frontier (Coelli et al., 1998).

In this paper we estimate technical efficiency using a stochastic frontier approach. A production frontier refers to the maximum output attainable by a given technology and an input bundle, while a cost frontier refers to the minimum cost to produce a given level of output. The underlining assumption of production function is that every farm is producing in a technically efficient manner, and the representative farm defines the frontier by using the "best practice" available to them. Any variation from the frontier is assumed to be random due to undetermined production factors. Each point on the frontier indicates the maximum potential output for a given set of inputs. The estimation procedure is stochastic and takes into account white noise plus an additional one-sided error representing the reasons why farms are away from the boundary. Inefficient farmers are located within the frontier, and therefore, from the estimation of a production frontier it is possible to measure the relative efficiency of some farms compared to the ideal or potential production (Greene, 1993).

With the model of Aigner, Lovell and Schmidt (1977) and Meeusen and van den Broeck (1977), the stochastic frontier has attracted a great deal of attention in the literature.

The authors proposed, separately, a model of estimation of a stochastic frontier production function using a Cobb-Douglas on a sample of N farms in which an additional random error v_i is added to the non-negative random variable, u_i, to provide:

$$\ln(y_i) = \beta \ln(x_i) + v_i - u_i \qquad i = 1,2,...N \qquad (6)$$

Where $\ln(y_i)$ is the logarithm of the output for the i-th farm.

x_i is a (K+1)-row vector, whose first element is "1" and the remaining elements are the logarithms of the K-input quantities (or values) used by the i-th farm;

$\beta = (\beta_0, \beta_1, ..., \beta_K)'$ is a (K+1)-column vector of unknown parameters to be estimated,

v_i is the random error and it accounts for measurement error and other random factors such as weather, natural disasters, etc. on the value of output variable, together with the combined effects of unspecified input variables in the production function. v_i is assumed to be a two-sided error term representing the statistical noise and are assumed to be normally distributed with mean 0 and variance σ_v^2 and

u_i is a non-negative random variable, one-sided error term representing technical efficiency (-u_i is the technical inefficiency) in production of farms. It is assumed to be i.i.d. u_i can, therefore, be expressed as the shortfall in output y from its maximum value given by the stochastic frontier $f(x_i;\beta) + v_i$. Although this one-sided term can follow different type of distributions such as half-normal, exponential, and gamma (Aigner, Lovell, and Schmidt 1977; Greene 1980; Meeusen and Van den Broeck 1977), we will assume, along with the typical literature on stochastic frontier approach, that u follows a half-normal distribution with unknown mean and variance $(u \sim N[m_i, \sigma_u^2])$.

The technical inefficiency effects, u_i, could be replaced by a linear function of explanatory variables reflecting farm characteristics and shocks variable (e.g., Battese and Coelli, 1995). The technical inefficiency effects are assumed to be independent and non-negative truncations (at zero) of normal distributions with unknown mean m_i and variance. Specifically,

$$\mathrm{u_i} = \delta_o + \sum_{j=1}^{J} \delta_j z_{ji} + \omega_i, \qquad (7)$$

where z_{ji} are farm and shocks explanatory variables associated with technical inefficiency; δ_0 and δ_j ($j=1,...J$) are parameters to be estimated; and ω_i is an independently and identically distributed with $N(0,\sigma_u^2)$ random variable truncated at $-\left(\delta_0 + \sum \delta_j z_{ji}\right)$ from below. The latter implies that $u_i \sim N(\delta_0 + \sum \delta_j z_{ji}, \sigma_u^2)$ truncated at zero from below. After substituting (7) into (6) the resulting model is estimated by a single-equation estimation procedure using the maximum likelihood method.

Once stochastic frontier analysis has been computed using the Battese Coelli model, one can recover the technical efficiency parameters associated to each single household. This is simply the complement to 1 of the technical inefficiency scores. Household technical efficiency is a proxy for unobserved agricultural household ability. This variable is of great interest given that the decision to participate in land markets will rely on the household agricultural ability (Deininger and Jin, 2002, Deininger Sarris and Savastano 2004).

When agricultural ability is considered, labor allocation between on-farm and off-farm is indirectly affected by the introduction of the rental market imperfections. An increase of the liquidity constraint due to the presence of transaction cost will induce farmer with low agricultural ability to work off-farm. At the same time, if the exogenous wage rate for off-farm employment increases, rental market will be concerned. Households with lower agricultural ability will rent out more land, and more efficient households will rent in more land. This joint effect will decrease the equilibrium rental rate and will increase the social welfare.

Compared to the perfect market equilibrium where no transaction costs are considered, the introduction of imperfections in rental market decrease social welfare to the extent that they generate a larger amount of households that prefer to stay in autarky. The effect of an increase of the transaction costs implies a decrease of the lower level and an increase of the upper level of the agriculture ability. The amount of land transacted, therefore, and the number of households that participate in rental market diminishes. Only the most efficient farmers will stay in the market.

With a well-functioning rental market the amount of land used for agriculture production should be independent of the amount of land endowment and the vector of household characteristics. Because of rental market failure *i.e.* the presence of transaction costs, the amount of land rented in is an increasing function of the agricultural ability and a decreasing function of households' land endowment. Only the most efficient producer, even with less amount of land rented, will rent in more land. As a result, we would expect that rental market allow a transfer of land from less efficient to more efficient producers.

Once agriculture ability is estimated using a stochastic frontier approach, we can use this variable as a covariate in a probabilistic model trying to investigate the participation in land market (both rental and sale market).

In particular, we would like to assess how the functioning of different factors markets can affect households' decision to participate in land markets. As stated earlier, in absence of markets imperfections, land markets allow improving efficiency and equity through the market allocation of land from large landowners to smaller ones. The proposition is justified by the so-called *inverse farm size - productivity relationship* that states that smaller farm is, generally, more productive than larger ones and use more labor per acre of area yield (Berry and Cline, 1979, Carter, 1984, Benjamin, 1995, Newell et al., 1997, Kutcher and Scandizzo, 1981). In this case, the amount of land cultivated should be independent of the amount of land owned, tenure status, human capital and other household characteristics. Rental market, consequently, would be used to obtain the optimum amount of cultivated land.

5. Land market participation

To verify the factor affecting the probability of participating in land markets, and to verify the effects of transaction costs on land market we implement two different models of land market participation.

First we run a multinomial logit in order to verify what are the factors affecting the probability of accessing land market. Although our theoretical model is based on rental market participation, and despite

the low level of land sale market activity, we complement our empirical implementation reporting also the results for sale market participation.

Then, to analyze the factors affecting transaction cost in land market, we use a modified ordered probit model that include specific variables explaining transaction cost. In this model, the cut-off point are not constant but depend on specific factors constraints.

5.1 Determinant of the probability of land market participation

In order to capture the effects of market imperfection on land markets we complement the theoretical model with an estimation of a multinomial logit for the amount of land rented in and out and sold and purchased. As discussed in the theoretical model, the amount of area leased in and out depends on different factors as agricultural ability, off-farm wage and opportunities, the endowment of land, the agricultural and no agricultural capital, and, finally, the transaction costs in rental market.

To empirically test this, we have estimated the following model. We define the function P_{nj} as the probability that household *n* will choose alternative j. There are *k* households' characteristic that are summarized in the vector $\beta_j x_n$ where $x_n = (x_{1n}, x_{2n}, ..., x_{kn})$ is the set of variables such as age, land ownership, education etc and $\beta_j = (\beta_0, \beta_{1j}, \beta_{2j}, ..., \beta_{kj})$ is the set of parameters that represent the impact of changes in *x* on the probability.

$$\Pr(y_n = j) = \frac{e^{\beta_j' x_n}}{1 + \sum_{j=1}^{J} e^{\beta_j' x_n}} \quad for \quad j = 1, ..., J \quad and$$
$$\Pr(y_n = 0) = \frac{1}{1 + \sum_{j=1}^{J} e^{\beta_j' x_n}} \tag{8}$$

To test the previous predictions empirically, we estimate a multinomial logit equation of the form:

$$R_i = \beta_0 + \beta_1 \boldsymbol{X}_i + \beta_2 \boldsymbol{Z}_i + \varepsilon_i \tag{9}$$

where R_i is a dummy equaling 1 if household *i* rented out, 3 if it rented in land, and 0 otherwise, $\boldsymbol{X}_i$ is a vector of household characteristics and endowments, and $\boldsymbol{Z}_i$ is a vector of community characteristics.

5.2 Determinant of transaction cost.

Equations (2)-(5) indicate that producers' decision to enter land rental markets depends on their marginal productivity in autarky, $MP(\overline{A})$ as compared to the rental rate to be paid $r^{in}(T)$ or received $r^{out}(T)$ which is a function of transaction costs. Formally, the three regimes are characterized by

$$\left.\begin{array}{ll} \text{I. Rent - out regime } (A_i^* > \overline{A}_i): & MP(\overline{A}) + \varepsilon_i < r(TC^{out}) \\ \text{II. Autarky regime } (A_i^* = \overline{A}_i): & r(TC^{out}) < MP(\overline{A}) + \varepsilon_i < r(TC^{in}) \\ \text{III. Rent - in regime} (A_i^* < \overline{A}_i): & MP(\overline{A}) + \varepsilon_i > r(TC^{in}) \end{array}\right\} \tag{10}$$

A producer's marginal product $MP(\overline{A})$, will depend on his or her ability (α), endowment with land ($\overline{A}$), family labor ($\overline{L}$), assets (K), and the opportunity cost of labor which will be affected by the level of education (E) and the presence of opportunities in the local off-farm labor market (O). Defining a well-behaved net earning function $g(\alpha, \overline{A}, \overline{L}, K, E, O)$ with first derivative $g'(.)$, we can write a linear version of the latter as $MP(\overline{A}) = g'(\alpha, \overline{A}, \overline{L}, K, E, O) = \beta_0 + \beta_1\alpha + \beta_2\overline{A} + \beta_3\overline{L} + \beta_4 K + \beta_5 E + \beta_6 O$. Transaction costs are expected to depend on legal title over land, household characteristics Z, credit variables, and community characteristics. Defining an index variable y_i such that $y_i = 1$ if $A^* < \overline{A}$; $y_i = 2$ if $A^* = \overline{A}$; $y_i = 3$ if $A^* > \overline{A}$, we can rewrite (10) as an ordered probit model that can be estimated using maximum likelihood methods

Variables we expect to affect marginal productivity are agricultural ability (α), the derivation of which will be done by means of the stochastic frontier estimate and will be discussed below, household characteristics, and wealth proxies.

6. Data sources and descriptive statistics

6.1 General overview

Although land reform has been completed and much information on it is available, less information is available on rural land market development after the privatization process: how much, under what type of contracts, under which conditions, etc., the exchange of land has developed in the various countries in the region, and what have been their constraints and effects. Ownership structures, resulting from the way land was privatized and redistributed, have a significant impact on the way land markets have developed

Table 1: Land Titling and Ownership

Land class	Ownership of land Share of hh	Have a legal title for land
0-0.25 Ha	87%	47%
0.25-0.6 ha	98%	69%
0.60-1.16 ha	99%	88%
1.16-11.5 ha	99%	92%

Source: Authors' computation on Albania's LSMS 2005

This first important evidence is that 96% of rural household own land but differences among farm size and discrepancies between ownership of land and land titling especially among small holders. Land market can be developed by increasing land security.

Second of all, Albania has always been a labor intensive country and as the literature suggests (Swinnen and Vranken, 2006) where distribution of land to rural households made small scale family farms dominate land markets are not already developed. Few transactions, both in rental and sale market, all of it household to household and mostly informal.

Only 10% of the rural households are involved in the rental market, and another 10% in the sale market. The share of households that are renting in is, in average, 6.22% and a remaining 3.62% are renting out. On the sale side, the demand for land is only 6.65% compared to 1.57% of households that are selling land. We can conclude that there is an excess of demand for land that can somehow explain low land price and high land rent.

6.2 Factors affecting agricultural production

According to Civici (1994, 1999) the privatization of agriculture land has lead to the creation of new production structure distinguished into four categories of private farms: subsistence farms, semi-subsistence farms, commercial farms, and farmer association. The difference between the type of farms resides in their agricultural production and performance and their integration in market activity. Most of the farms are oriented to meeting consumption needs of the family and are characterized by small operation.

- Subsistence farms are small private farms, they do not use many inputs, and are not engaged in market and economic activity. Although their situation has improved since land reform, this kind of farm relies on government intervention, and operate in order to satisfy consumption needs of their families.
- Semi-subsistence farmers have a higher level of initiative compared to the first category, and after the privatization process, they have started already market production. Besides meeting consumption needs of their family, they try to obtain some surplus production of relatively durable products such as staples (wheat and potatoes), livestock product, or cash crop such as tobacco, sunflower, melons. The surplus is and then sold in the market. In order to maximize their production, this type of farmers invest in inputs such as seeds and fertilizers and embark also in mechanization process.
- Commercial farms are characterized by a higher degree of agriculture mechanization. They use (owning or renting) agriculture assets such as tractor or transportation vehicle and are engaged in commercialized agriculture. They have a higher willingness to accept risk compared to the first two categories and can rely on credits to invest in farm activity. Albeit representing a very low share of farms in Albania, their existence is really important for agriculture development.
- Finally, farmer associations is a form of organization that enables farmers to join their efforts to farm privately. Some 90 private farmers associations operate in the whole territory of Albania, however their existence is facing some problems due to the lack of experience, but also to the unwillingness to cooperate together, mutual mistrust in interpersonal relationships, lack of innovativeness; limited time perspective (Daku, 1997). However among the benefits of those organization are the possibility of gaining from size economies, the ability of stabilizing market institutions.

To analyze farmers involvement in market activity, and try to characterize farmers in our survey, we use three proxies of market integration:

(i) the sale of product ratio

(ii) hired labor or purchased factor inputs ratio, and

(iii) the level of technology

Not having enough information on the level of technology, that is if land is farm by hand, or using farm machinery, and the very few number of agriculture assets do not allow to infer on the last variable. The only information that we have is that, according to our survey, households own very few tractor and other agriculture assets. By computing some average characteristics of farmers we can recover the factors affecting agriculture production.

Sale of product ratio

According to the 2005 Albanian LSMS, it appears to be that most of the household activity is oriented to meeting family food needs rather than commercial sale. First, only 28% of farmers sell product on the market. Moreover, the ratio between quantity of crop harvested and sold is very low. In average only 9% of the crop harvested are sold by farmers. This ratio increases among farmers that rent in reaching 14% suggesting that rental market help to increase market integration of farmers and exit the subsistence category. In addition to that, only 14% of the farmers sold the crop harvested in a market outside the community, but

the share of farmers who sold their crop output to markets outside the community reach 22% if farmers are renting in land. Market integration is therefore not developed and increasing the functioning of rental market can offset this agriculture constraints. An explanation of this low ratio of farms with sales can be referred to the lack of structured markets for farm products. In order to favor agriculture development, we should expect this ratio to be higher and policy should be oriented to achieving this goal. We can presume that fragmentation does not help to increase market integration of farms. Dividing farms by quantile of land class, it appears to be that larger farmers, in the last category, have the double of the ratio compared to the farms of the first category. Policies oriented to farm consolidation or to enabling the functioning of land markets can help to overcome these constraints.

Table 2: The Sale of Product Ratio

	Ratio quantity crop production sold to quantity crop production harvested
Type of farms	
All farms	9%
Rent in	14%
Rent out	4%
Land Class	
0 – 0.25 ha	5.3%
0.25 – 0.6 ha	7.6%
0.6 – 1.16 ha	9%
1.16 – 11 ha	10.3%

Source: Authors' computation on Albania's LSMS 2005

Hired Labor or Purchased Factor Inputs Ratio

The second proxy to assess farmers' integration in market activity is the ratio between hired labor of purchased inputs to total inputs used. Not having information on the number of hired labor used in agriculture production but only expenses for hired labor, one can only compute the share of hired labor to total input cost. In addition to that, we do not have information on input use from own production. The latter would have been important given that agriculture modernization entails an increasingly increased purchase of inputs produced outside the farm. Therefore the only proxies that we can use is the share of pesticides and seeds expenses to total inputs costs and the share of hired labor cost to total input expenses. A larger share points towards a more modernized agriculture.

Table 3: Hired Labor and Purchased Input Ratio

	Share of seed expenses to total inputs purchased	Share of pesticides expenses to total inputs purchased	Share of hired labor expenses to total inputs purchased
Type of farms			
All farms	22.7%	58.3%	2.8%
Rent out	8.5%	47.2%	0.6%
Autarky	23.5%	58.2%	2.8%
Rent in	20.6%	65.2%	4.6%
Type of farms	**Share of households who used seeds**	**Share of households who used pesticides**	**Share of households who used hired labor**
All farms	57.5%	85.2%	7.7%
Rent out	25.4%	59.7%	3.0%
Autarky	57.3%	85.5%	7.3%
Rent in	79.1%	96.5%	16.5%

Source: Authors' computation on Albania's LSMS 2005

The first striking constraint to agriculture production is the lack of hired labor used. In average, the share of hired labor expensed to total input cost is only 3%. This suggests that farmers, in Albania, rely on family labor or unpaid workers (relatives, or neighbor members for exchange of labor force). The sources of this dis-functioning could be ascribed to different factors such as small size of farms, limited opportunity for off-farm employment, low technology, subsistence level of production. However, farmers who rent in land, spend three times more hired labor than the average farmers

The majority of farmers use pesticides and seeds. However the share of farmers who used seeds is larger among farmers who rent in land, and reach almost 97% for pesticides use. As a result, we can argue that it is not the availability of pesticides or seeds but their cost that may constraint agriculture in Albania. In fact, pesticides cost, represent, in average, 58% of total farmers input cost. This share is larger among household who rent in land. High input prices associated with lack of access to short-term credit for buying input can impede agriculture growth.

To summarize, it appears that the most relevant factors affecting agriculture production are lack of market integration for small farmers with a majority of farmers concentrated in subsistence agriculture, input cost more than availability, and low level of technology. Among others, lack of credit, poor infrastructure affect the development and the performance of the agriculture sector.

5. Econometric Results

5.1. Estimation of the production function

Table 4 reports the results of the stochastic frontier estimate. To diversify between factors affecting technical efficiency we have a set factors of production as predictor of the gross value of agriculture production and add some household characteristics as well as land titling and community variables to explain efficiency.

The results indicate that most of the coefficients of the factors of production are positive and strongly significant, which means that agriculture income increases with the increasing use of each factor.

The coefficient of land endowment and area of land irrigated, family labor, and input use are significant. Agriculture capital represented by water pump and number of machinery although not significant, they have the sign expected. One should note the extreme importance of irrigation for farming in Albania. Only 12% of households have a water pump. Increasing access to irrigated system can increase agriculture income.

To assess for labor market imperfections we have split the labor production factor into household labor and hired labor. The presence of labor market imperfections for agricultural production has been widely -documented in the literature (Deininger and Feder, 2001). In fact, although households' size and their land endowment should not affect agriculture income if markets were perfect, this is not a realistic assumption in most rural areas. As a consequence, low supervision costs and high labor input on family farms can be translated into higher productivity gains for smaller farms. The coefficient of family labor is positive and significant, whereas hired labor not. This seems to confirm that supervision constraints matter and that family labor strongly affect agriculture income. According to the regression, an increase of 10% in the number of family labor will increase, in average, 4% agriculture income.

Land endowment appears to be the most significant factor explaining agriculture income. The elasticity of land is significant at 1% level with a coefficient is almost equal to 1. In the presence of well-functioning land markets, a households' land endowment should not have a significant impact on agricultural activities as they should always be able to rent in additional resources. At the same time, in the context of Albania, where rental market is still embryonic and in situations where other potential collateral is not available and farmers are capital constrained, land ownership will affect farmers' ability to access credit markets and therefore have a significant impact on agriculture income.

The variables proxies for input use are extremely significant in explaining agriculture income. If properly applied farm inputs are essential for the improvement of both quality and quantity of farm yield. In general we can identify three main problems in input use: later delivery, high prices, and short supply. Availability of input, therefore, is a central issue in Albania in light of the fact that their use may strongly affect agriculture income. Only the farmers who can afford their prices, or can have access to them can experience higher income. To assess this, we observe that the value of input elasticity is 0.5 and that the variable is significant at 1%. Not having enough information and variables on quantity of input used but only total cost at the household level, one can only infer that there is an input constraint and more in depth analysis verifying input market in Albania should be realized.

There appears to be also capital constraints. The number of machines owned by farmers increase agriculture income but the coefficient is very low. The fragmentation of plots and the inability of using scale economies reduce the number of machinery owned. Less than 1% of farmers own one or more tractor, and less than 10% of households own animal or mechanical plough. Agriculture production, given the size of holding, is largely labor intensive.

Given that most of the farms, regardless of the size, use very few hired labor, we can conclude that the survey encompasses subsistence or semi subsistence farms who use very few inputs. One should

complement the analysis with analyzing the ratio of purchased factor inputs to all inputs used in production. Some preliminary analysis that have been implemented in order investigate allocative efficiency have pointed towards the under utilization of inputs. Not having enough information on land values and shadow wages, these results are only partial and have to be complemented with additional information. This is an index of farmer involvement and integration into the wider economy, since modernization of an agricultural process necessarily requires increased purchase of inputs produced outside the farm and not inputs out of own production.

The presence of capital constraints has been a consequence of land privatization: the fundamental assets of the cooperatives such as machinery, fruit trees, farm equipment etc. were either simply given away or were sold at very low prices. The smaller the plot or the amount of land owned, the less the farmers will use input because they cannot take advantage of economies of scale. When we say input constraints I refer to that, and policy recommendations would point towards consolidation of land holding by increasing the functioning of land market so that farmers can farm larger amount of land and benefit from economies of scale. In order to do so policies able to remove constraints in the credit market in order to be able to buy more inputs, invest in land improvement would increase agriculture income. Micro credit system is easier to be implemented for investing in input use or to buy agriculture capital. Credit for investing in land improvement are more difficult to realize. . I think that with the variables in the survey this is the maximum I can verify analyzing technical efficiency.

The results confirm the expected role of standard production primary inputs. In particular, the positive role of irrigation in total factor productivity and the imperfection in labor input and capital market are of interest.

5.2. Technical Efficiency

Tables 5 summarizes the results of the technical efficiency analysis using the gross value of total agricultural production as dependent variable and the Battese-Coelli approach and programs. The function is estimated with fixed village effects, and with specific village variables computed from the community questionnaire. Technical efficiency is defined relative to an “efficient frontier” and all farms operating on the efficient frontier are classified as 100 percent efficient with an efficiency score equal to 1. Farms using more inputs to produce a given output level than those on the efficient frontier are inefficient and their efficiency score is less than 1 (or 100%).

There are several variables that appear to increase efficiency among farmers (those appearing in the to be negative and significant according to the z-value in the reported table).They include number of plots owned, receiving agriculture technique advices, inheritance, credit access. The variable number of plot is aimed at capturing the level of fragmentation on technical efficiency of the farm. The underline hypothesis is that the larger the number of plots a household has, the more distant they are from the dwelling, less efficient is the household.

According to the estimated regression an additional plot of land for each household would change technical efficiency by 20%, irrespective of the initial level of efficiency. Land consolidation by increasing

the functioning of land market (rental and sale markets) and removing fragmentation could help to increase agriculture efficiency. Although household size does not appear to be significant, farmers rely on family labor and the larger the households the more efficient they are. Contrary to our expectations, average education of the household appears to be efficiency decreasing. Even replacing the variables with years of education of the head the results are confirmed. It may be the case that more educated individuals have more opportunities outside of agriculture. At the same time it seems that older household head are more efficient to younger ones. Older and less educated household head are more efficient to younger ones. Younger are more willing to start off farm business or to migrate and leave farming activities to the family.

According to the results, income from remittances does not help to increase efficiency. Although the relation between migration and land market development is bi-directional, according to our results it seems that migration is stimulating investment in off farm activities. Households with a larger share of income from migration are less efficient and will most probably stimulate the supply of land by giving land to more efficient producers. We can conclude that income from remittance is thus used to involve in off farm business. It will be most probably those households that receive a large share of income from remittance will be more willing to embark in off-farm activities and therefore, more increase supply of land by renting or selling.

Although inheritance is a controversial issue in explaining agriculture efficiency, it seems to play a significant role for increasing efficiency. This is an important issue for the functioning of land market. It appears that farmers are substituting land market development by transferring land through inheritance and it seems that by doing so agricultural efficiency is increased. Even though the role of rental markets in intergenerational transfers of land is an issue that has received relatively little attention so far in ECA markets (Swinnen and Vranken, 2006), according to our results, transfer of land through inheritance is efficiency increasing. This issue deserve further in depth analysis in order to investigate how transaction costs of inheritance (tax system) can affect efficiency and equity in land market. Inheritance in Albania has taken the same form of the agrarian reform of 1991 (Civici, 1999, Guri and Jouve, XXX): distributing land equally among heirs, and leading to more fragmentation. Land is inherited equally by the heirs, in general the sons inherited land, and the daughters receive a small plot for constructing a house (Guri and Jouve,). The development of rental market, and the possibility of making interfamily rental arrangement, or cash settlement, could overcome the problem of “breaking” the farm. In order to confirm the statement of our econometric results one should complement the analysis trying to investigate the compensation system and the effective land transmission between family members.

While having a received a deed with land privatization in 1991 does not appear to significantly explain efficiency , it seems that inheritance is used to transfer land to members that are willing to start agriculture farming.

The length of time since land is acquired seems to affect positively efficiency. The lower the number of years since land was acquired, the more efficient are the farmers. This results seems to highlight that land privatization did not succeed in transferring land to the ones who were willing to start agriculture practicing.

Younger member left to migrate and income from migration is used to start non agriculture activities, the redistribution of land between members that want to stay in agriculture is more efficiently driven by inheritance than through land market operation.

However, the most important results of the efficiency analysis are the presence of credit constraints. This can be observed analyzing the community variables related to credit.

It appears to be that the more you can access to credit to start a small business in a governmental or private bank that is far from the community the more the household is efficient. This means that only few farmers (10% on average) can access this form of credit will be efficiently increasing. In addition to that, the variables high interest rate applied (although not significant), and the availability of credit within the community are both efficiency decreasing. This means that farmers are credit constraint; they receive high interest rate, and cannot increase efficiency accessing credit within the community. The inability to access credit within the community and to be efficient could be overcome by constructing specific micro finance system that allow larger number of farmers to access to credit and increase efficiency. Micro finance systems that allow financing agriculture capital, giving the constraints in this sector highlighted could be of fundamental importance.

Farmers who received soil advices appear to be more efficient. By receiving information necessary to protect and improve long-term agricultural productivity farmers were able to increase efficiency. The same is true for farmers who participated in irrigation program will benefit from efficiency gains.

The average technical efficiency (Table 6) is 28%, and the highest value of TE is 91% not 100%. Also the value of sigma v, which is the variance of farm-specific technical efficiency to the total variance of output, is 0.46. This means that 46% of the variance in output is due to difference in efficiency. Technical efficiency is thus very low but one should recall that only small farms have been surveyed and not farmer associations or commercial farms. But given that the bulk of agriculture production is driven by small family farms after the privatization process one can raise two points: on the one hand there are several constraints to agriculture but even a minor removal of those constraints could benefit farmers. Improvement in land access, input use and capital market can lead larger productivity gains compared to a situation where most of the farmers where lying at the frontier. On the other hand, the most efficient farmers are those who rent in. They have an average of 37% of technical efficiency which in the average largest score among type of farmer (autarky, rental market, sale market) and according to class of land owned. The direct conclusion is that land consolidation should pass through a increasing in rental market activity first and than removing the barrier to the functioning of sale market.

Table 4: Stochastic Frontier Estimate on gross value total agriculture production

Stochastic Frontier	
	Log Total Value of Ag. Production
Log ha of land owned	0.440***
	(3.41)
Log area of land irrigated	0.019**
	(2.02)
Log value of hired labor	0.050
	(1.57)
Log number of family members working on farm	0.330***
	(4.53)
Log cost of total inputs except hired labor)	0.491***
	(18.58)
# machine	.096
	(1.83)
Dummy has water pump	0.050
	(0.44)
Constant	4.866***
	(21.52)
Observations	1796
Sigma v	46%

Source. Computed by authors
Dummies for districts estimated but not reported
Absolute value of z statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Determinant of Technical INEFFICIENCY of total agricultural production using village fixed effects (A negative sign of the coefficient increases farmer's efficiency

	Coef.	**Std. Err.**	**z**	**P>|z|**
Nb. of plots	-0.206	0.023	-9.010	0.000
Highest years of education in hh	0.042	0.012	3.620	0.000
Age of the head	-0.008	0.003	-3.040	0.002
Household size	-0.041	0.019	-2.080	0.037
Dummy has participated to an irrigation program	-0.445	0.249	-1.790	0.073
Dummy has received soil advices	-0.650	0.166	-3.900	0.000
Share transfer from total income	1.001	0.125	8.010	0.000
Nb. of years since land was acquired	0.004	0.004	0.870	0.386
Dummy has deed from land since 1991	-0.130	0.098	-1.330	0.184
Dummy land is inherited	-0.427	0.088	-4.840	0.000
Community level variables				
Interaction between distance to bank and access to credit from govt and private bank	-0.017	0.005	-3.670	0.000
Interest rate for getting a loan to start a small business at the community level	0.003	0.006	0.560	0.574
Dummy source of credit within the community	0.120	0.088	1.360	0.173
Constant	2.905	0.233	12.460	0.000

Source. Computed by authors

Table 6: Summary of Efficiency Parameters

	Technical Efficiency	Share of households
All household	28%	100%
Rent out	13%	3.6%
Autarky	28%	90.2%
Rent in	37%	6.2%
Sale land	20%	1.6%
Autarky	29%	91.8%
Purchase land	19%	6.7%
Land class 0-0.25 Ha	22%	25.7%
Land class 0.25-0.6 ha	27%	25.6%
Land class 0.60-1.16 ha	30%	23.7%
Land class 1.16-11.5 ha	33%	24.9%
HH with <=2 plots	24%	45%
HH with 3 plots	29%	22%
HH with 4 plots	30%	16%
HH with >5 plots	35%	17%

Source. Computed by authors

Technical Efficiency in rental market

	Rent out		Autarky		Rent in		ALL HOUSEWHOLDS	
	Average TE	***Share of HH***	**Average TE**	***Share of HH***	**Average TE**	***Share of HH***	**Average TE**	***Share of HH***
TE <=20%	**2.4%**	*76.12%*	**6.5%**	*40.91%*	**6.6%**	*22.61%*	**6.3%**	*41%*
TE between 20 and 50%	**29.6%**	*10.45%%*	**34.0%**	*36.71%*	**34%**	*46.09%*	**34%**	*36%*
TE>50%	**62%**	*13.43%*	**62.5%**	*22.38%*	**63%**	*31.30%*	**63%**	*23%*
Average TE	**13%**	*3.6%*	**28%**	*90.2%*	**37%**	*6.2%*	**28%**	*100%*

Source. Computed by authors

We have classified households who participate in rental market in three groups according to the average technical efficiency (below 20%, between 20 and 50% and over 50%). The table shows that rental market allows transferring land to more efficient producers. The majority of farmers who rent out have very low average level of technical efficiency (2.4%). Farmers, who rent in land, are not only more efficient (also in the first class) but the distribution of farmers in the second and third class is larger. 77% of the households who rent in are in the second and third group and have larger level of agriculture efficiency.

Table 7: Household Characteristics according to technical efficiency group

	Unit	TE <=20%	TE between 20 and 50	TE>50%
Total value of ag output/ha	US$/ha	552	1901	3914
Total land owned	ha	0.69	0.95	0.79
Area of irrigated land (ha)	ha	0.19	0.38	0.37
Cost of hired labor	US$	3	6	18
Number of family member working on farm	nb	1.1	1.5	1.2
Cost of inputs (except labor)	US$	195	370	415
Number of plots	nb	2.6	3.3	3.3
highest years of education in hh	nb	9.9	9.8	9.8
Age head of hh	years	51.7	52.3	53.0
Household size	nb	4.5	4.7	4.7
Distance from community to bank	km	3.2	4.6	3.8
Share transfer from total income	%	33.8%	25.1%	24.0%

Source. Computed by authors

To investigate in more details what are the factors affecting technical efficiency, we have summarized the main descriptive statistics according to efficiency group. Land and number of plots owned do not appear to be the main factor affecting agriculture efficiency. As highlighted in the results of the regression on technical efficiency, more efficient household farm less amount of land on a same average of plot compared to the two other groups. However irrigation seems to be the major differentiating factor on land constraints. Household of the third group (having more than 50% of efficiency score) have twice the hectares of land than household of the first class. Household characteristics such as family size, education do not seems to be differentiating factors, but older household head are more efficient. Among the other factors are labor constraints: more efficient farmers spend 6 times more on hired labor and twice on total input cost than households in the first two groups. The variable summarizing credit constraints also confirm credit access as the differentiating factor. With an undeveloped credit market, especially micro credit (given the size of farmers), farmers who will be able to access credit far from the community are more efficient.

It appears to be that household with a large share of income from remittances will embark in off-farm activities leaving land to be developed by others.

Table 8: Results of the Multinomial Logit on Rental Market Participation

Multinomial Logit on Land Rental Market Categorical variable: 1=rent out; 2=autarky; 3=rent in		
	Rent out	**Rent in**
Technical Efficiency	-2.237***	1.818***
	(2.71)	(3.81)
Total land owned	0.543***	0.418***
	(2.84)	(3.56)
Area of irrigated cultivated land is sqm	-0.179**	0.232
	(2.19)	(1.16)
Household size	-0.042	-0.056
	(0.45)	(0.83)
Age head of hh	-0.003	-0.042***
	(0.21)	(3.92)
Years of education head of hh	-0.201*	-0.052
	(1.74)	(0.46)
Years of education head of hh square	0.015**	0.001
	(2.32)	(0.12)
Number of family member working on farm	-1.296***	0.291***
	(4.87)	(2.70)
Log value of hired labor	-0.252	0.257***
	(0.99)	(2.82)
Dummy has deed from land since 1991	2.286***	-1.380***
	(2.68)	(3.67)
Share of land with deed 1991 in the community	3.559	-0.354
	(1.19)	(0.21)
KM from community to nearest bank	-0.025	-0.021
	(0.96)	(1.29)
Community: Access to credit from bank (gvt. or private)	-0.328	0.187
	(0.66)	(0.51)
Nb. of years since land was acquired	-0.035	-0.015
	(1.42)	(0.83)
Share transfer from total income	1.323**	-0.422
	(2.56)	(0.86)
infrastructure index	0.415**	0.034
	(2.42)	(0.26)
Dummy conflict over land in community	-0.533	0.006
	(1.42)	(0.02)
Annual Interest Rate	0.029	-0.023
	(0.80)	(0.75)
Constant	-25.417	-1.867
	(.)	(0.89)
Observations	1796	1796
Log likelihood	-487	

Source. Computed by authors

Note: District dummies included but not reported. Absolute value of z statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

We find that rental markets help to bring land to younger and more efficient producer At the same time, ownership of land does not seem to be the most crucial factor in the decision to participate to rental market. Education seems to bring farmers out of land market activity. In the case of Albania, education is expected to negatively influence households' agricultural ability, and thus having a negative effect on leasing in, and a positive on leasing out.

The sign of land endowment points towards confirming the fact that land is not the most significant factor, in Albania that drive the decision to participate in rental market. What we would have expected is the coefficient on the land endowment to be negative for those who rent in and positive for those who rent out, implying that land rentals market transfer land to those with lower levels of endowments. The presence of markets imperfections and, therefore, the arising of economies of scale in production will affect the optimal operational farm size: in particular it will increase the probability of leasing out and decrease the probability of leasing in with farmer's land endowment. However, from our results it appears that , although very significant, it is not the scarcity of land endowment that affect the probability to rent in.

However, the availability of irrigated land increase the probability of participating in rental market (although the variable is not significant for those who are renting in).

Labor market constraints affect the decision to participate in rental market. As a results of farm organization, and the existence of family farms in Albania, larger households (in terms of adult household members involved in on-farm activities) lease in more land, whereas smaller household tend to lease out more land. In addition to that, only farmers who can use more hired labor tend to rent in more land.

Land privatization did not necessarily transfer land to the ones who wanted to embark in farming. Having a deed from 1991 increase the probability of renting out land and the variable is not significant for the ones who are renting in.

The credit market constraints are represented by the dummy on accessing credit within the community and the distance from the nearest bank. The latter is negatively related with both the decision to participate in the rental market. From the survey we do not have any information over the destination of the loan and, therefore, we would have expected that the household that is renting in will use this additional money to continue to rent in and the household that is renting out will continue to invest in off-farm activities. We can conclude that access to credit remains a binding constraint (which might be alleviated by offering machinery as moveable collateral). At the same time, remittances is an important determinant of land rental decisions suggesting that the larger the share of income from remittances the larger will be the probability of renting out and start off farm activities.

As stated before, the more the integration in market activity, the more the probability of renting in land increase. This seems to confirm the hypothesis stated in the agriculture constraints that removing the barriers to rental market help agriculture development.

Table 9: Results of the Multinomial Logit on Sale Market Participation

Multinomial Logit on Land Sale Market Categorical variable 1=sale 2=autarky 3=purchase		
	Sale land	**Purchase land**
Technical Efficiency	-1.808*	0.352
	(1.80)	(0.59)
Total land owned	0.334	-0.237
	(1.53)	(0.85)
area of irrigated cultivated land is sqm	5,401.683	-15,236.529*
	(1.51)	(1.86)
Household size	0.143	-0.018
	(1.27)	(0.22)
Age head of hh	0.038*	-0.002
	(1.78)	(0.12)
Years of education head of hh	-0.004	0.144
	(0.02)	(1.11)
Years of education head of hh square	-0.001	-0.010
	(0.13)	(1.32)
number of family member working on farm	-0.129	-0.060
	(0.67)	(0.39)
Log value of hired labor	-0.441	-0.543**
	(1.36)	(2.49)
Dummy has deed from land since 1991	0.179	-3.982***
	(0.22)	(9.91)
Share of land with deed 1991 in the community	-4.063	1.721
	(1.30)	(0.85)
KM from community to nearest bank	-0.045	-0.023
	(0.88)	(0.89)
Community: Access to credit from bank (gvt. or private)	0.007	-0.102
	(0.01)	(0.26)
Nb. of years since land was acquired	-0.005	-0.001
	(0.13)	(0.08)
Share transfer from total income	-1.753*	0.712
	(1.90)	(1.51)
infrastructure index	0.652***	0.067
	(2.78)	(0.36)
Dummy conflict over land in community	-0.135	-0.246
	(0.28)	(0.70)
Annual Interest Rate	-0.017	0.010
	(0.40)	(0.37)
Constant	-1.058	-21.431
	(0.33)	(.)
Log likelihood	-305	

Note: District dummies included but not reported. Absolute value of z statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

A first finding of interest from the equation on sale market participation is the non linear relationship between land and sale market. Instead of using the amount of land owned we use the number of plots to account for fragmentation. The significance of the coefficients for both number of plots owned and the square enables to compute the threshold value of number of plots that induce farmers to sell their land. If households have more than 4 plots they will be more willing to sell their land. An explanation could be that

they cannot benefit from size economies. After taking this into account, we can observe that there are 18% of farmers that have more than 4 plots and may be willing to sell their land if land market was not constraint. This is of great importance for the development of land market activity.

Another important factor of the productivity-enhancing impact of land markets is illustrated by the negative coefficient of farmer's technical ability on the probability of selling land. Less efficient producers are more willing to sell their land but it is not necessarily the case that efficiency drives farmers' decision to buy land. It may be that, despite their level of agriculture ability, farmers are willing to embark in agriculture production to increase their welfare.

The other factors affecting land sale decision is lack of credit within the village. Not having access to credit to cultivate their land, they are more willing to sell it. On the demand side, the larger the distance to bank the lesser the farmers are willing to purchase land. Removing the barrier to credit market functioning, can help either to expand agriculture operation or to transferring land to the ones who would like to do so.

Finally, an important results comes from the coefficient of having a deed from agriculture reform of 1991 and of 1946. Not having a deed on land increase the probability of purchasing land. This means that land privatization did not achieve in transferring land to the ones who wanted to embark in agriculture activities.

Table 10: Technical Efficiency in sale market

	Sale Land		**Autarky**		**Purchase land**		**ALL HOUSEWHOLDS**	
	Average TE	***Share of HH***	**Average TE**	***Share of HH***	**Average TE**	***Share of HH***	**Average TE**	***Share of HH***
TE <=20%	4.9%	*2.11*	6.2%	*86.08*	2.3%	*11.81*	**5.6%**	*39%*
TE between 20 and 50%	32.4%	*1.56*	34.0%	*94.93*	36.8%	*3.51*	**34.2%**	*42%*
TE>50%	55.6%	*0.64*	61.5%	*96.21*	65.5%	*3.25* |	**61.4%**	*18%*
Average TE	**18.4%**	*1.67*	**28.7%**	*91.78*	**16.03%**	*6.65*	**28%**	*100%*

Results from ordered probit estimation of the rental (first two columns) and sale (last two columns) market participation equations are reported in the table above. To interpret them, recall the coding of 1 for the rent-out (sale), 2 for the autarky, and 3 for the rent-in (purchase), implying that a positive coefficient will increase the probability of renting out (selling) land. As stated in the estimating strategy, the main equation of the ordered probit allows investigating the factors affecting the marginal productivity of farmers. As ability is defined only for households who engaged in agricultural production, inclusion of this variable reduces the sample to agriculture producers, excluding landless households. We also report regressions without ability in column 1, and 3.

The highly significant coefficient on ability implies that, in line with expectations, land rental (sale) markets improve productivity of land use by transferring land from less to more efficient producers. Contrary to our expectations, it is not necessarily the case that the most efficient producers will be more willing to buy land. This relationship is due to two main factors. On the one hand, sale market in Albania is a recently developed market. On the other, although we do not have enough information in the survey to predict this hypothesis, there may be high land prices that impede farmers to access sale market, and to prefer rental

market activity. This could explain the larger share of households involved in rental market compared to sale market. This relationship may be exacerbated by credit market imperfections proxied by high interest rate or difficulties in accessing credit market.

Ordered Probit results				
	(1) Participation to Rental Market	**(2) Participation to Rental Market**	**(3) Participation to Sale Market**	**(4) Participation to Sale Market**
Total land owned	0.245***	0.223***	-0.271***	-0.263***
	(3.57)	(3.26)	(3.74)	(3.66)
Technical Efficiency		1.155***		-0.241
		(6.48)		(1.16)
Household size	0.052**	0.048**	-0.031	-0.030
	(2.19)	(2.02)	(1.27)	(1.23)
Age head of hh	-0.012***	-0.014***	-0.002	-0.002
	(3.08)	(3.56)	(0.52)	(0.46)
Years of education head of hh	0.075**	0.059	0.050	0.053
	(1.97)	(1.57)	(1.44)	(1.53)
Years of education head of hh square	-0.006**	-0.005**	-0.003	-0.003*
	(2.48)	(2.11)	(1.54)	(1.65)
Wealth index	-0.072	-0.077	-0.050	-0.050
	(0.96)	(0.98)	(0.72)	(0.72)
Transaction Costs	**From Rent out to Autarky**	**From Rent out to Autarky**	**From Sale to Autarky**	**From Sale to Autarky**
Dummy has deed from land since 1991	1.167***	0.457**		
	(3.58)	(2.48)		
Share of land with deed 1991 in the community			-2.089*	-0.779
			(1.88)	(1.03)
KM from community to nearest bank	-0.012	0.008*	0.019*	0.018*
	(1.52)	(1.66)	(1.52)	(1.55)
Community: Access to credit from bank (gvt. or private)	0.067	0.027	0.189	0.193
	(0.41)	(0.16)	(1.49)	(1.45)
Infrastructure index	0.189***	-0.033	0.263***	-0.007
	(3.04)	(0.56)	(3.52)	(0.13)
Dummy conflict over land in community	-0.058	0.023	0.079	0.081
	(0.40)	(0.19)	(0.44)	(0.46)
Annual Interest Rate	0.012*	0.012*	0.005	0.005
	(1.84)	(1.90)	(0.49)	(0.53)
Transaction Costs	**From Autarky to Rent in**	**From Autarky to Rent in**	**From Autarky to Purchase**	**From Autarky to Purchase**
Dummy has deed from land since 1991	0.357**	1.283***		
	(1.98)	(3.90)		
Share of land with deed 1991 in the community			-0.790	-2.083*
			(1.05)	(1.87)
KM from community to nearest bank	0.008*	-0.013	-0.013	-0.013
	(1.68)	(1.55)	(1.75)	(1.75)
Community: Access to credit from bank (gvt. or private)	-0.131	-0.124	-0.216	-0.210
	(0.87)	(0.81)	(0.57)	(0.59)
Infrastructure index	-0.000	0.174***	-0.010	0.268***
	(0.01)	(2.74)	(0.19)	(3.59)
Dummy conflict over land in community	0.022	-0.060	-0.016	-0.017
	(0.19)	(0.42)	(0.13)	(0.14)
Annual Interest Rate	0.006	0.005	-0.012	-0.012
	(0.68)	(0.56)	(0.53)	(0.49)
Constant	5.640***	-1.719	0.074	0.543
	(19.11)	(2.30)	(3.55)	(0.60)
Observations	1796	1796	1796	1796

Note: District dummies included but not reported. Absolute value of z statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Although the coefficient of land endowment is strongly significant in both set of regressions, its sign has to be interpreted carefully. Contrary to our expectations and to results in previous studies, it is not necessarily the case that land markets allow to transfer land to household with lower endowment of land. The variable is significant and positive for both tenant and landlord in the rental equation, and negative for buyers and sellers in the sale regressions. This result seems to corroborate the idea that farmers, in Albania, are using more rental market to overcome constraints in the sale market.

A strong diversification appears to affect rental and sale market. Although education of the head does not seem to affect rental decision, more educated household head tend to prefer to engage in land sale market. In addition to that, access to family labor is also an important factor that increases the propensity of renting in land but does not affect purchasing land.

5. Conclusion and policy implication

Despite the decline in the contribution to GDP, agriculture can still play a dominant role in increasing Albanian rural income and reduce the incidence of poverty. Raising agriculture productivity, and removing the barrier to the development of land markets are crucial issues.

There are several constraints that Albanian farmers face in agriculture activity: insecure property rights, labor constraints, inputs use constraints, credit constraints. Although from the data we do not have information on informal land transactions, it appears to be that most of the farmers are using inheritance and intra family arrangement to overcome the transaction cost in land markets (both rental and sale).

Increasing tenure security, by facilitating formal land registration, and creating an efficient system of land administration, especially in rural areas, will increase the willingness to rent out or selling land. As a secondary result, land administration generates pro-poor growth by removing obstacles in the credit market, ensuring the use of land documents as a collateral for loans.

Although Albania has a strong system of irrigation, as a result of the former state owned cooperative system, irrigation is not accessible for all plot and cause a major constraint in increasing agriculture productivity. Increasing access or implementing irrigation based investment as well as in infrastructure will help farmers to increase agriculture productivity.

Due to remaining restrictions, and difficult procedure for selling land, sale market is still relatively developed compared to rental market. High land prices, and complicated procedures for computing compensation for former owners prior the first Agrarian Reform of 1945, contribute to the increase of land value.

Land rental markets have the potential to provide access to land to those who are more productive. Contrary to our expectations, it is not necessarily the case that rental market help transferring land from land abundant to land scarse household. For the scale unit of farms in Albania, it appears to be that farmers who are really willing to embark in agriculture, despite the instable revenue they can gain from it, are using rental

arrangement (whenever possible) or informal family transfer to do so. Remittances are used to start riskier but more profitable off farm activities.

	Expected sign of the relationship		
Variables	**Rent in/Purchase (Demand of Land)**	**Rent out/Sale (Supply of Land)**	**Relationship**
HH size	(+) larger hh rely on family labor especially in small scale rural economies	(-)	Labor markets imperfections
Head's age	(-) if younger are more willing to participate to land market	(+) if younger prefer off farm activities or elderly prefer to rent out (sell)	Younger versus Elderly or distribution of land to the ones who did not involve in agr. operations
Education of the head	(-)	(+) more educated individuals have more opportunities outside of agriculture	On farm versus off farm activities
Wealth Index	(-) Due to credit market imperfections less wealthy will have lower probability to rent in (purchase) land	(+)	Credit Constraints
Land endowment	(-) Suggested by theoretical model	(+) Suggested by theoretical model	Land market transfer land to more productive producers with lower level of land endowment
HH technical ability	(+) Suggested by theoretical model	(-) Suggested by theoretical model	
Transaction Costs			
Legal title over land Deed from 1991	?	(+)	Legal recognition of ownership
Km from community to nearest bank	(-)	(-)	Credit constraints
Access to credit from Bank	(+)	(+)	Credit constraints
Infrastructure Index	(+)	(+)	Land market development
Conflict over land	(+)	(?)	Eliminate conflict
Average interest rate in the community	(-)	(-)	Credit constraints

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