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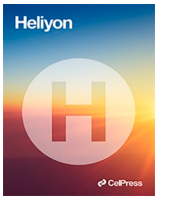

The tenant's pre-emption rights in Italian agriculture: An introductory economic evaluation

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ABSTRACT

The paper explores the almost "unknown territory" of the economic evaluation of pre-emption rights (PRs) in agriculture, by focusing on two PRs held by tenant farmers in Italy: on purchasing of rented land and on contract renewal. For both PRs, the main characteristics and an historical framework are provided. The research has three goals: PR values estimations, exploring factors that affect the tenant's choice of rating the PRs, exploring factors that affect the PR values. Lacking a specific theory on the PR value in agriculture, an ad hoc conceptual framework has been developed by referring mainly to the theory of farm evaluation, which has proved helpful in discussing the research findings. Research goals are achieved by employing the contingent valuation, logistic regression and linear regression methods. Data collection refer to an on-farm survey covering 55 tenants, which has provided a database of 230 lease contracts.

Among the analysis findings, the worthiest of note are: a) the farmer's PR on the neighbouring land for sale is more appreciated than the tenant's PR on rented land for sale; b) tenant's PRs favour the growth of farm size not only by securing plots with labour intensive crops but also by guaranteeing adequate economies of scale; c) the percentage of contract area on total rented area is the main factor that induces tenants to evaluate the PR of a specific land under contract; d) the value of the PR on the purchasing of rented land mostly increases in relation to the dimension of the farm machinery fleet, the presence of intensive crops and the tenant's interest in the rented land, while investments made on it positively affect the value of the PR on contract renewal.

1. Introduction

The pre-emption right (PR) can be simply defined as the right to be preferred to somebody else in a transaction. This right is also a juridical tool widely applied to pursue specific structural policy goals in agriculture. In fact, legislations grant designated beneficiaries the right, in many countries, according to both farmers' and overall society's interest. Co-owners, neighbouring landowners and tenants are generally the main grantees of the right. However, in some countries, specific authorities (e.g., agencies) can also be entitled to it.

The SAFERs (Sociétés d'aménagement foncier et d'établissement rural) can exercise a PR on all farmland on sale in France [1], with the purpose of reselling it to another buyer or to fulfil objectives of environmental protection [2]. The Polish Agricultural Property Agency (NSCA) attempts to control agricultural land turnover by means of a PR. This right is exercised if the farmland was not bought by an individual farmer, who enlarges his/her family enterprise not above 300 ha of arable land. However, when the land is leased, the Agency's right can be exerted only if the tenant has renounced his PR [3]. In Germany, the Law on Real Estate Transactions establishes

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a PR to protect farmers against non-agricultural investors. In the case that the buyer is a non-farmer and there are farmers who need to expand their business in the region, the competent state agency (Landgesellschaft) may exercise its PR and transfer the land on sale to a farmer, at the same price as specified in the original purchase contract [4].

A PR can be used to achieve different (not only agricultural) policy goals, according to the type of right holder (co-owners, neighbouring landowners, tenants, local farmers or public agencies) such as: continuity of the farm business, improvement of the farmland structure, protection of the local farmers' ownership or prevention of speculation, the building up of a reserve in land consolidation area or other social/environmental objectives, with the PR granted to a public agency [5].

Implementation of PRs is, generally, a complex and delicate matter since it affects the interest of the landowner's interest and assesses it with the interest of third parties or society [6]. Reviews on the use of the PR in agriculture show different outcomes. For example, in France, the procedures for applying the PR are relatively short and simple and it seems well integrated in the land transfer system, although it is rarely exerted. On the contrary, the attempt to introduce PRs in Croatia in 2008 produced a lot of discussion and complaint, based on favouritism and a highly bureaucratic system [7]. In Poland, the exercising of the PR by the NSCA is reported to have been rare in the last decade, however, Government intervention in the purchase of farmland through implementing the PR is planned to be reinforced, thanks to new regulations that are more constraining than German and French ones [8]. In Germany, the number of land sales in which the PR was involved is reported to have increased from 242 in 2005, to 801 cases in 2011 [4]. Likewise, the neighbour owner's PR appears quite pervasive in Italian agriculture, affecting most agricultural land sales [9].

From the literature we can make a list of countries where the tenant is the right holder on the rented land for sale and/or the farmer-owner is the right holder on the neighbouring land for sale: The Netherlands, Belgium, Italy, France, Portugal, Sweden Macedonia, Romania, Poland, Slovakia, Hungary, Slovenia Lithuania, and Latvia ([10–16].

Despite this fact, few studies tackle the topic of PR's inclusion in the agricultural legislation from an economic viewpoint and, among them, empirical works appear to be rather rare. Some papers offer comparative overviews of PR applications or stress its role in relation to land use policy goals [5,13,17]. Antinelli et al. [18] underlined the impact of neighbouring farm owner's PR on the farmland market in Italy. According to a survey among tenants in Poland, they indicated that the PR for leased land was very valuable to them, given that 81.75% of tenants stated their will to use this PR [19]. A recent study based on data from first-price privatization auctions in East Germany [20] hypothesised that granting tenants PRs would decrease the number of bidders and estimated a reduction of the price paid in land sales by 16.7%, as an effect of the right. A similar result was found by Neyeter and Nivievskyi [21] for privatization auctions in Ukraine. They showed that the introduction of the PR reduces the land price and enhances the tenant's likelihoods of succeeding as well as his/her surplus, at the expenses of a potential purchaser and the seller. However, their work demonstrated that the introduction of the PR also leads to inefficient distribution and deadweight losses for the economy. Galletto [9] made a first evaluation of the neighbouring owner's PR, which was based on an Italian farmers' sample survey. In a choice experiment where it was hypothesised to offer farmers PRs, Moog and Bahrs [22] showed that farmers attribute a positive benefit to the PR and their willingness to pay for it depends on how the right is structured.

To the best of our knowledge there seems to be no study dealing with empirical evaluation of PRs held by tenant farmers. Likewise, the economic literature on the PR topic does not provide support to the issue of the PR in agriculture from a theoretical viewpoint. In the six papers cited by Ref. [9] PRs refer to rights included in a private contract and only two of these deal with PRs granted by law. All these works focused mainly on the profitability and efficiency of including PRs in a contract and on the social benefits they can determine for society. However, they did not present any theory that can be utilized for assessing the value of PRs granted by agricultural law.

Following the path opened by Ref. [9], the purpose of this paper is to take a step forward in the evaluation of PRs in agriculture. This issue seems to be particularly relevant for the dynamics of agricultural land, given that the value embedded in the PR may determine the farm enterprises evolution towards a target type of business and, in some cases, shape the rural landscape from a social viewpoint.

Therefore, in order to fill the aforementioned literature gap on PR in agriculture, we decide to focus on PRs held by tenant farmers and, more specifically, on the evaluation of the two PRs Italian agrarian law grants tenants: that on the sale of rented land and that on the renewal of lease contract. The former has been applied since 1965, and has become increasingly criticised for its interference with the neighbouring farm owner's PR; the latter was introduced in 2001, and was intended as a tool to stabilize the owner-tenant relationship beyond the duration stated in the initial lease contract. The latter seems to be a peculiarity of Italian agriculture, since the literature does not provide any evidence that it is included in other agrarian legislations, and – according to our knowledge – has never received any consideration by economic research.

Paying renewed attention to PRs held by tenants appears to be an important issue for Italian agriculture, also in the light of the last Census data [23]. These data confirm that renting is the preferred way for farmers to expand their farmland. In fact, in 2020 the land under tenancy, (including free uses) amounted to about 6.2 million hectares, and considering a longer time horizon, the rented area has practically more than doubled in the last thirty years.

From a theoretical viewpoint, we attempted to define a conceptual framework to interpret the value of both the rights, and explaining the reasons why this value can be positive or null. referring mainly to the theory of farm evaluation [24]. From an empirical viewpoint, the research has multiple goals:1) to provide pilot estimates of both PRs with the aim of assessing the importance of these agricultural policy tools by comparing their values with land values, rents and other PR values; 2) to investigate the appreciation of the two PRs among the right holders, by looking for reasons that induce tenants to give these rights a value; 3) to explore the determinants that mostly affect the PR value and estimate their impact on it.

According to these goals, the methodologies adopted are: a) contingent evaluation, to obtain estimates of the PRs (goal 1); b) logistic regression applied to both farm and lease contract levels, to discover variables that significantly influence the tenant's choice of assigning rights a positive value (goal 2); c) multiple regression to discover variables that impact the PR values (goal 3). These variables

are selected among a set of factors that, according to economic principles may impact on the dependent variables. Therefore, the hypotheses that their coefficients significantly diverge from zero is tested for both types of regression models.

An on-farm survey based on an ad hoc questionnaire was used for data collection from a sample of 55 tenant farmers who operate in an Italian Region (Veneto), which allowed the analysis of 230 lease contracts.

The debate on the PR as a policy tool in agriculture and its possible changes concerns both western [25] and even more so eastern European countries [26–28], where it has been introduced, sometimes without a deep discussion, mainly since 1989. Some of the previously cited works convey researchers' or political operators' opinions on the validity or usefulness for famers and the agricultural sector of granting tenants PRs. However, they do not report information about how they are evaluated by the beneficiaries and which factors are implied in their valuation. Therefore, the main novelty of this study lies in an exploratory analysis in the almost "unknown territory" of the economic evaluation of the PRs included in the agrarian legislation and particularly those related to tenants. It aims at giving policy operators reliable findings on which they can base a rethinking of these policy tools in the light of changes and challenges that modern agriculture must face, not only in Italy but also in other countries.

The article is organized as follows. Sub-section 1.1 introduces the two rights and inserts them in the historical framework of the Italian agrarian policy. Sub-section 1.2 provides some basic concepts for interpreting their values. The second section relates to the methods applied for pursuing the research goals and illustrates the data source and collection. The third section reports and discusses the findings of the investigation and data analysis. In the conclusion, after recalling the main outcomes of the study, we deal with some agrarian policy implications, research limitations and perspectives of future studies on the PR issue in agriculture.

1.1. The tenant farmer's pre-emption rights in Italy: features and historical context

In Italian agriculture we can find three PRs:

1. the direct farmer-tenant's pre-emption right (DFTPR) on the acquiring of rented land, which dates back to1965[1];
2. the farmer-neighbouring owner's pre-emption right (FNOPR) on a plot of land for sale adjacent to his/her property, which was granted in1971[2];
3. the tenant's pre-emption right on contract renewal (TPRCR) in2001.[3]

An important requirement of the DFTPR is that the right holder must be a "direct farmer". According to Italian agrarian law, this is a person who directly and routinely engages in land cultivation and animal rearing, if the total family workforce is equal to or greater than one-third of that required by ordinary land cultivation and animal rearing. In addition to the tenant's direct farmer status, other conditions have to be met by the right holder in order to exercise it. They are the same as those required for the FNOPR [9].[4]

As for the other two PR, the DFTPR take the form of a Right of First Refusal, where the right holder must be submitted to a third party's offer.[5] The procedure to implement the DFTPR is also the same as that applied for the FNOPR [9]. It requires notification provided by the farmland seller to the tenant, including the sale proposal consisting in the preliminary contract of sale, the selling price and other clauses, containing provision for the pre-emption option. The tenant may exert his/her PR within a month and payment must occur within three months, from the 30th day after getting the proposal of sale.[6] In the event that the seller neglects notification of the preliminary contract or the amount paid is greater than what appears in the following registered sale contract, the tenant may exercise the "right of redemption" within one year from the registration, i.e. he/she can purchase the farmland at the same provisions specified in the original contract by substituting the third-party purchaser.

Historically, this right was introduced in a period still defined by the so-called "rural exodus". The main idea was that, to prevent or at least slow down the exodus from rural areas, farmland must be owned by those who work manually on it. Therefore, this right would have contributed to supply direct farmer-tenants with land at a rather cheap price, i.e. the land of their lease contracts. Its cheapness was due to both the low rent they paid and the indefinite duration of the contract. In fact, the freezing of the rent for agricultural lease contracts dates to the Italian Fascist regime intervention in the Spanish civil war (1936) and the adoption of rents lower than those that would have been determined by a free market was reinforced by various acts introducing the so-called "Equo Canone" (Fair Rent).[7] Prorogation of the contracts started at the end of World War II (1945). The conjoint action of these two factors determined a double farmland market: the main market, i.e. the market for land free of constraints, and a secondary market for rented land, where prices were considerably lower. This implied that a landlord could either sell his/her land on the latter market at a low price or sell it on the

[1] Law no. 590 of 26 May 1965.

[2] Law no. 817 of 14 August 1971.

[3] Law no. 57 of 5 March 2001.

[4] These conditions are: a) the tenant has been farming the land on sale for more than two years; b) he/she must not have sold any other land in the preceding two years (apart from very small plots); c) the land, which is the subject of pre-emption, in addition to any other property already owned by the tenant, must not exceed three times the workforce of his/her family. Moreover, the DFTPR cannot be exercised in case of permutation, forced sale, forced liquidation and expropriation.

[5] Another form of PR is the Right of First Offer, where the right holder must submit the owner his offer.

[6] This period may be extended to one year if the tenant has applied for a mortgage.

[7] At the beginning (1947), the Equo Canone was based on the evaluations determined by a provincial commission. Subsequently (1971), it was anchored to the cadastral rents of land under contract, which were multiplied by a set of coefficients defined by the land features.

free land market, once he/she had paid the tenant a "premio di escomio"[8] – a sort of redemption price – to put an end to the lease contract. In the subsequent years the General Law on agrarian contracts was enacted (1982). Although adoption of the Equo Canone is still reaffirmed, this law decreed a definite duration for the existing tenancies, allowed variable duration for new ones and gave the two parties back the power to freely agree on the contract rent, with the supervision of the unions of both landowners and tenants [29].

Only six years after the introduction of the DFTPR, Italian law established the FNOPR on land for sale. The holder was, once again, the direct farmer and the main aim was expansion of his/her ownership. This PR was increasingly exercised and, paradoxically, it found a real obstacle in the DFTPR, given that the former can be exercised only if the direct farmer-tenant does not exercise his/her PR. In fact, a usual strategy for a landowner who wishes to sell his/her land to a direct farmer-third party buyer avoiding the FNOPR is: to sign a lease contract with a direct farmer buyer, who therefore becomes a direct farmer-tenant, and then sell him/her the land by the exercising of his/her DFTPR. In 2001, the FNOPR was also granted to agricultural cooperatives and agricultural societies, so long as such firms are personal partnerships and most of their associates are qualified as direct farmers. Recently (2016), the number of its beneficiaries widened, given that it was also granted to the "professional farmer".[9]

The third PR, the tenant's pre-emption right on contract renewal (TPRCR), appeared in the Italian agricultural legislation only in 2001, following a period of expansion of the lease contracts in agriculture, although a sizeable number of them were few years' (one to three years) agreements. It can be interpreted as an answer to the need for stability of the farm, by creating a tool to allow the continuing of the tenancy on the same land. This PR refers to all tenant farmers, without any further specification. The Law states that, if the landlord intends to lease the land under contract to a third party on the expiry date, he/she shall notify the tenant of the offers (tenders) received, by registered letter with acknowledgement of receipt, at least ninety days before the expiry date[10]. The tenant can exercise his/her right of pre-emption if, within forty-five days from receipt of the notification, he/she offers the same rent and conditions as those communicated to him/her by the landlord. If the landlord, within six months following the expiry of the contract, has leased the land to a third party without prior notification of the offers received or at more favourable conditions than those communicated to the tenant, the latter can exercise his/her PR within one year following the expiry of the previous contract. So, thanks to this PR, a new lease relationship begins under the same terms as the contract concluded by the landlord with the third party.

Currently, the FNOPR is by far the most applied among the three pre-emption rights. In many areas, assuming that the direct farmer and professional farmer are the prevailing types of farmers, it is quite difficult to find farmland that is not encumbered by this right. However, given the increasing expansion of leasing contracts in Italian agriculture [23,30,31], it appears worth investigating how tenant farmers consider and evaluate the two PRs that concern them.

1.2. Conceptual framework

As previously said, the literature does not provide relevant contributions to defining the economic content of the two PRs from a theoretical point of view. Therefore, developing some ideas proposed in Ref. [9], we highlight three components as central aspects influencing the values of the two tenant's PRs: 1) the highest amount the right holder is willing to pay in terms of purchase price or lease rent; 2) the price or rent that the best third-party buyer or tenant is willing to pay, 3) the alternatives for the right holder and the third-party buyer in terms of other plots of land to be purchased or rented.

Concerning the first component, in the case of DFTPR, the theory of farm appraisal [24,32] suggests that it can be viewed as the discounted flow of additional income the farmer gains once he/she becomes owner of the rented land. This income depends not only upon the rent he/she will no longer pay, but also from different factors related to the farmer's and his/her family's specific conditions [33],[11] the farm structure, the relation between this structure and the features of the rented plot on sale, including the possibility to make some investment on the acquired land that would not be feasible if it remains rented. According to the relevance of all these aspects, the discounted flow results in a maximum purchase price which may depart from the average market price for the plot on sale. In the case of the TPRCR, the maximum rent payable by the tenant derives mostly from the organizational and scale economies the farm will continue to benefit from by protracting the lease agreement beyond the original expiry date or by further exploiting the investments he/she had made on the rented plot. Likewise, this rent may depart from the average market rent for the plot.

The second component refers to the best bid a third-party can offer in terms of price or rent [34]. By comparing it with the right holder's willingness to pay for the land, we can assume that the value of the DFTPR is the difference between the two purchase prices, while the value of the TPRCR is the discounted flow of the difference between the two rents. Clearly, these differences are not zero and both the rights have a positive value only if the right holder thinks he/she can succeed in exercising his/her PR, i.e. he/she is able to beat the best bid offered by a third party. Therefore, the tenant's thoughts about his/her competitor, i.e. the third-party with the best bid, appear to be crucial in defining the PR value.

The third component relies on land which can result for the tenant as an alternative to that encumbered by the PRs. In fact, when

[8] Its value ranged within the difference defined by the land prices on the two markets, in relation to the bargaining power of the two parties.

[9] To be considered a professional farmer, three requirements are needed: a) to possess professional knowledge and skills in agriculture; b) to devote at least half of the total working time to agriculture; c) to earn at least half of the overall income from agricultural work.

[10] This obligation does not apply when the tenant has communicated that he/she does not intend to renew the lease or in the event of termination of the lease for serious non-compliance.

[11] Among these conditions we can consider the age, family life cycle, generic attitude to becoming owner or increasing the current farm property (embedded either in the right holder or other members of his family), education level, skills and ability in performing agricultural activity and, overall, the perspective of continuing the business.

defining the two PR values, a comparison must also be made with the prices or rents the tenant is willing to pay for similar[12] plots of land available on the market. The two rights retain the previously defined PR values only if these are higher than the difference between the right holder's bid and the best third-party's bid for similar plots, given that, in the contrary case, he/she can achieve a similar benefit at a likely lower cost. However, also in this circumstance, it is possible that the rights retain positive values – though more or less reduced – given that the exercising of the PRs as well as the appearance of similar plots for sale or rent are uncertain events that may not coincide with the dates when the PRs must be exerted.

Both PRs undoubtedly accrue the stability of the farm business, however how much this stability is reflected on the discount rate employed to capitalise the previously defined cash flows likely depends upon the tenant's subjective features. What is clear is that the time horizon for discounting the additional income is different: while the acquisition of property makes it virtually unlimited, in the case of TPRCR the time horizon is unpredictable, given that it ranges between the duration of the new lease agreement, if the landlord ceases to rent his/her land when the new contract expires, and a theoretically everlasting tenancy, if the tenant thinks that he/she is able to renew the contract on each future expiry date. Anyhow, though its length relies on the tenant's expectations, we reasonably argue that the time horizon is limited.

In the case of multiple lease agreements, the tenant owns a portfolio of both PRs, so the value of each is likely to vary according to the factors mentioned above. The time span for taking advantage of the DFTPR varies according to the residual duration of each contract. However, this length can be considered as the minimum period for exercising the right, according to the likelihood of continuing the tenancy with a new contract, which is eased by the TPRCR.[13] Instead, in the case of the TPRCR, the right arises when the lease contract is stipulated, but it can be exercised only when the contract is expired.

2. Methodology and data

According with the multiple questions of the investigation, different methods of analysis are employed. They are briefly presented in Fig. 1, where the datasets used in the analysis are also indicated. Step 1 is intended to provide pilot estimates of both PRs, Steps 2 and 3 are devoted to discovering the main reasons that induce tenants to positively rate the PRs, Step 4 attempts to identify factors that mostly affect their values.

The following sections will clarify each of the four steps showed in the flowchart and the meaning of the acronyms. Sections 3.2 to 3.4 will report and discuss results coming from their application.

2.1. Value estimation of the two PRs

Contingent Valuation (CV) was selected to estimate the two PR values. Although several limitations can be attributed to this method [35], we considered it adequate for our task. Another possibility, i.e., the comparison of real land sale prices with and without the exercise of the DFTPR was impractical because of the absence of a reliable data bank of land sales, which supplies information on the PR exercise.

Willingness to pay (WTP) is by far the most employed indicator for CV studies, particularly in the environmental field. However, willingness to accept (WTA) seems to fit the purpose of our research better from a theoretic and practical viewpoint, notwithstanding the downsides of its adoption, mainly a possible over-estimation of the value [36,37]. In fact, both the tenant's rights are considered embedded in his/her status, and consequently they are strictly linked to the direct farmer's and/or tenant's notion. Hence, compensation may occur only for not exercising these rights in the case of rented land sale or lease contract renewal with a third-party. By not exerting the PRs the tenant may incur a potential income loss described above, which is better measured by WTA [38,39]. In addition, investigations to assess WTP for both the rights did not produce any result, given that tenants consider questions on WTP for the rights simply implausible. In contrast, questions about WTA were easily understood, likely because some tenants remembered compensations related to the old "premio di escomio" or have heard of cases of compensation for the renouncement of exerting the FNOPR.

In this regard, it should be remembered that the two above-mentioned PRs are individual rights, which cannot be transferred to other persons, and that third parties are not allowed to pay the tenant to give it up, but merely to freely renounce it.[14] Differently from what is reported for the FNOPR [9], to our knowledge, there is neither evidence nor rumours of cash payments for renouncing the DFTPR from third-party buyers to right holders. Likewise, there is no indication on values for the TPRCR and thus no reference value if either of the rights was available to be employed in our investigation, to be suggested to farmers. This practical aspect and the exploratory meaning of the research drove us to opt in favour of open-ended queries to attain a value for the PRs, although we are aware of the drawbacks implied by this choice, which are mainly reported to consist of the variability in answers and sizeable rates of refusal [40,41]. Unlike most CV researches applied to environmental problems, the purpose of our study is not to define a possible compensation an authority should pay a group of damaged people, rather to assess the relevance to tenants of PRs they own. In order to reduce such problems, we paid particular care in both designing and presenting the questionnaire.

[12] To be considered similar to the rented plot and therefore be real alternatives, these plots should at least allow the same crops and differ not too much in term of size, location and productivity.

[13] It is worth noting that the TPRCR, by favouring the prolonging of the leasing agreement beyond its expiry, increases the probability of exercising the DFTPR [9].

[14] Tenants renouncing to exercise their right when the rented land is going to be sold are sometimes reported to be included in the sale contracts for the DFTPR.

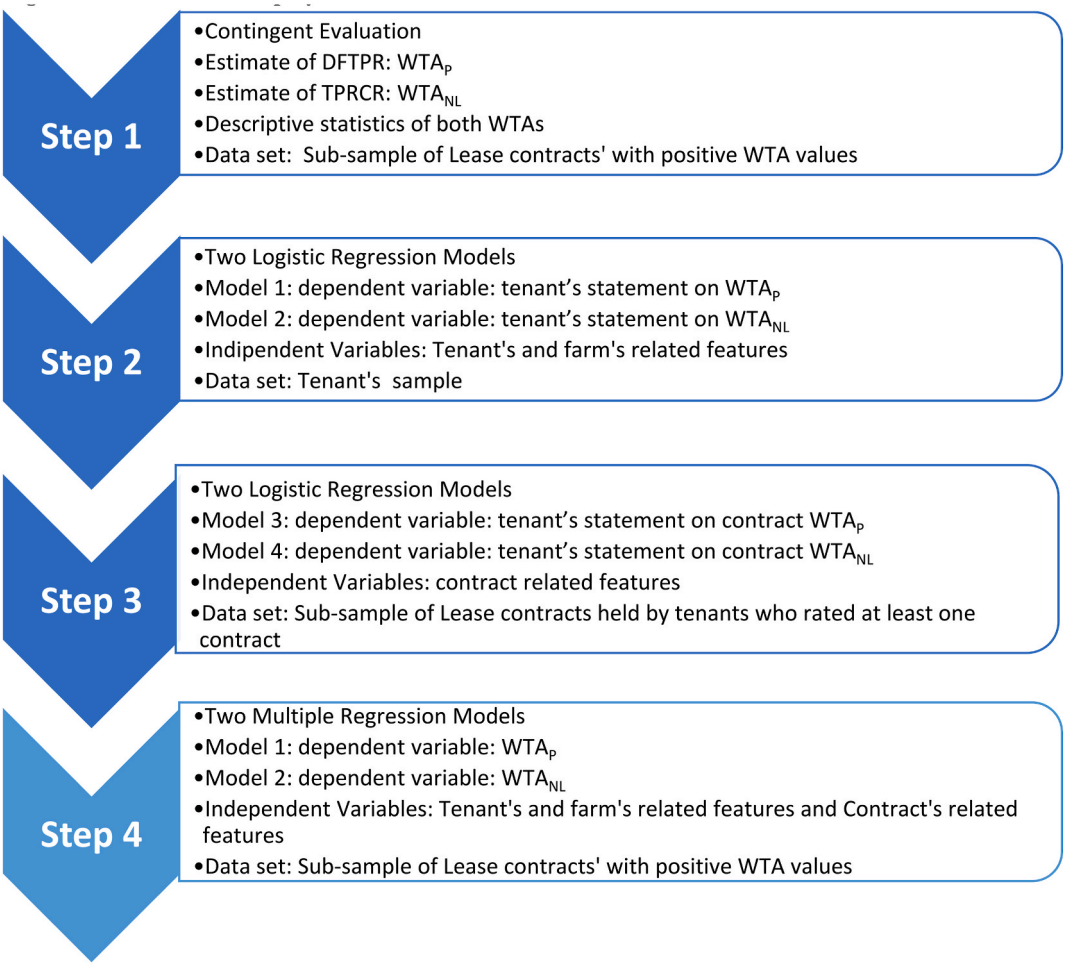

Fig. 1. Flowchart of employed methods.

Operationally, a tenant was submitted the subsequent two questions to estimate the WTAs for each lease contract belonging to his/her portfolio:

1. 'Considering the sale of the land rented under this contract, what is the minimum sum of money per hectare you would be willing to receive for not exercising your PR on it?'
2. 'Considering the renewal of this contract when it expires, what is the minimum sum of money per hectare you would be willing to receive for not exercising your PR on the new contract?'

The answer to the former question gives the WTA_P in the case of purchase, which is an estimate for the DFTPR, the answer to the latter question supplies the WTA_{NL} in the case of a new lease contract, which is an estimate for the TPRCR.

2.2. Tenants' assessment of positive PR values

The economic framework reported in the previous section makes it clear that some tenants may not attribute any value to one or both PRs for all the lease contracts they hold. Moreover, in the case of multiple agreements, a tenant who evaluates one of the contracts belonging to his/her portfolio may rate the value of another null. Apart from specific cases where the PRs are not valuable for the tenant farmer,[15] it appears interesting to investigate reasons that induce a tenant to assign his/her PRs a value or not. This was performed only for those factors that may impact on the first economic component, i.e. the discounted additional income flow, because no information is available on the third parties' bids a tenant can face. All the factors increasing the first component will also increase

[15] E.g.: the tenant has decided to cease his business within a few years or the landlord has communicated that he/she intends to farm the land directly, replacing the tenant.

the probability that the tenant beats the best third party's bid and so is able to rate the PRs. This hypothesis seems realistic not only for the choice of rating a specific contract-related PR but also when a tenant chooses to rate at least one PR within his/her contract portfolio. Both farm structure and tenant-related aspects can be used to discriminate farmers between those who give all their contracts a null PR value and those who evaluate at least one contract. On the other hand, for farmers in the latter situation, the choice relies on the contract features to discriminate between land plots that receive and do not receive positive PR values.

In pursuing the second goal of the research, we adopted logistic regression, which appears to be a suitable method to analyse a binary choice variable such as the evaluation of a PR by estimating the odds linked to any independent variable (either quantitative or categorical) which may affect this choice. In our study this method has a double use, since it provides contributions of the significant variables for classifying: a) a tenant as one who positively rates the PR rather than one who does not, and b) a lease contract as one that receives a positive PR value rather than one that does not. Hence, it gives a prognosis (or propensity) to resolve one or the two events.

Briefly, in this model, the dependent variable is the tenant's statement of a positive (not zero) WTA value or the lack of it (no reported value). It takes on a value 1 for the first event and 0 for the second. Its probability is equal to $1/1\ (1 + e^{Y})$, with Y defined by the linear combination in equation (1):

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots \beta_i X_i + \ldots \beta_n X_n. \quad (1)$$

where: β0 is the constant, i.e. the value of Y when the value of all covariates are equal to 0; β_1 - β_n are the estimates of the parameters; $X_1 - X_n$ are the factors that affect the choice. The model is estimated by logit transformation, which results as a linear function in the independent variables.

Operatively, a set of four models was defined, two for each WTA. In the first two models the regression equations are estimated with reference to all the sampled farms, and the dependent variable equals 1 for a tenant who gives at least one contract a positive value, and otherwise equals 0 (Step 2).

As explanatory variables (X_i) we use the main tenant's features and farm structure aspects, which are supposed to affect a general propensity to evaluate or not the PRs, such as the tenant's age and sex, his/her educational level, the presence of stable employment for other family members and hired workforce, the presence of intensive crops on the farm, the presence of animal rearing, the contracting of debts, total farm area, the area under lease agreements, share of the rented area on total farm area, the number of lease contracts and number of rented plots. The expected impact of most of them on the farm income can be found in Table 1 included in Galletto's paper [9]. While we may suppose that all the factors resulting in a positive impact on the farm income flow favour both the choice to evaluate the PRs, we lack indications about the effects of other features such as the tenant's age, his/her educational level or other aspects related to his/her family. For this reason, and given the exploratory nature of our investigation, we prefer not to enter all the independent variables in the models, rather to adopt the stepwise procedure in selecting those that best fit the dependent variable.

In the other two models the regression equations are estimated considering all the contracts belonging to farmers having evaluated at least one contract, and the dependent variable equals 1 for a contract with a positive value, and otherwise equals 0 (Step 3). The independent variables relate to peculiarities of both a contract and its referred land, which are supposed to impact the tenant's decision to be compensated for renouncing his/her PRs on specific land under contract by affecting the discounted income flow. They include features such as the area under contract, the share of the area under contract on the total farm rented area, the number of plots included in it, its residual duration, its rent, the value of the rented land, the tenant's investments in the rented land, his/her interest in it, and the possibility to easily find other land for renting or purchasing in the neighbourhood. In fact, a high availability of land to be leased or sold may positively impact both the PRs, by reducing competition and so increase the probability to succeed against third-parties. The stepwise procedure was adopted also for this set of variables.

Although the choice to give the PR a positive value relies partly on subjective feelings and opinions, including that on the possibility to succeed or not with a third party in exercising the right, the use of these models allows us to isolate a set of characteristics that may explain at least partially the tenant's choice to give PRs a positive value or not.

2.3. Factor affecting the PR values

Our investigation's third goal, namely to discover the variables that impact the values of the two tenant's PRs, was accomplished by two multiple regression analyses for both WTA_P and WTA_{NL} (Step 4). This method is widely used in cross-sectional studies to test several independent variables on a quantitative dependent variable, bearing reliable indications on their impact.

As for the logistic regression, we decided to adopt the previously mentioned set of factors relating to the tenant, farm structure and rented plot. This implies that the WTA function related to both the PRs for the land under a specific lease contract can be specified by equation (2):

$$WTA = f\ (T, FS, L, u_{WTA}), \quad (2)$$

where T accounts for tenant's features, FS accounts for tenant's farm structural features, L accounts for aspects related to the lease contract and land under it, and u_{WTA} is the error term. In this way, we intend to test their influence on the part of the PR value which rests on the objective features under the tenant's control, while his/her affection for the plot and conjectures on the bid of the best third-party buyer/tenant remain in the error term. Nevertheless, the two models (for WTA_P and WTA_{NL}) represent a step forward in comparison with the previous regression models used in the empirical work on the evaluation of FNOPR [9], where the right value was estimated only for a generic adjacent plot of land, according to the farmer's preference.

For these models, we also adopted the stepwise procedure in selecting the independent variables. Some of the excluded variables

may have some influence on the PR, however they are not included because of multicollinearity or the limited sample size. The error term includes either the effect of variables not covered by the survey or the partial effect of those that are excluded because of multicollinearity.

2.4. Data collection

Our survey relies on tenant's direct interviews by means of a questionnaire to achieve a favourable reception and give some explanation when required, given that the complexity of the topic required a personal approach, which included a visit to the farm centre. Among other simpler ways of data collection, we considered face-to-face interview the only one that could generate an adequate tenant's involvement, limiting the risk of superficial or hurried answers. Few contacted tenants refused the interview. The setup of the questionnaire was undertaken being aware of the delicacy of some questions, especially those related to the assessment of the two PRs. A pre-sample test was introduced to achieve correct comprehension of all the questions.

The questionnaire consists of two parts: the first collects data on features related to the tenant and farm structure, the second contains questions on contract-specific features and can be expanded in accordance with the number of lease contracts the tenant holds, the last deals with the WTA assessment. Variables included or derived from these two parts are presented in Tables 2–5. At the end of the second part, the two questions related to WTA are preceded by two questions on the availability of purchasable and rentable land in the same area under contract, which may affect the third economic component of the PR value.

In order to achieve a high reliability in the PR values assessed by the tenant, a short recalling of the basic aspects of the two rights is introduced in the third part. If the tenant attributes the plot of land under contract no PR value, he/she was asked to reflect and rethink this decision, and eventually to confirm it or assess a positive value to the WTA. When, on the contrary, the tenant expressed a value, the WTA_P was compared with the land value previously assessed (as a percentage of it) and the WTA_{NL} with the rent paid (as a multiple of it) before accepting it, so making the tenant aware of his/her initial evaluation and giving him/her the possibility to adjust it. In this way we tried to limit the risk of excessive WTA values. This method seems to operate appropriately, and the interviewees answered to the two crucial questions promptly in most of the cases. Indeed, both the questions were in general considered plausible and comprehended without difficulty by tenants. In this way, answers generated not a generic, but a specific per hectare WTA, regarding to a single well-defined plot.

Interviews were conducted by three interviewers who were experts on farm economic issues, and were previously trained on agricultural contract legislation and PRs. The survey took place during the winter 2018–2019 and was based on a sample of farms situated in the Veneto Region. While previous research on FNOPR relied on farmers all belonging to the same municipality [9], we refer to farmers located in a vast area encompassing four provinces within the Region. The survey covered mainly cropping flatland, but also hilly land, where some vineyard plots are located.

Veneto ranks among the first Italian agricultural regions. In 2020, total agricultural production reached 6094 million euros, of which 3046 were related to crop cultivations, 2100 to animal rearing and 673 to agriculture-connected activities. The total agricultural added value was 2855 million euros [42]. Given the limited average farm surface, part-time is quite high and a 30.5% reduction in the number of farms has taken place since 2010. Some structural data reported in Table 1 present a brief picture of the regional agriculture.

Lists of direct farmer tenants obtained from farm unions were the basis for the sample selection procedure, which can be summarised in the following steps:

1) Tenants were stratified by size and product specialisation (cereal and industrial crops, intensive crops, animal rearing), to better represent the diversified situation of the regional agriculture. More specifically, because cereal and industrial crops are evenly widespread in all the Veneto flatland, we identified three sampling zones, according to the farm centre location: a) province of Vicenza focused on farms with animal rearing, b) province of Rovigo focused on farms with orchards, and c) province of Verona focused on farms with vineyards. Frequently, the leased plot location went over not only the municipality but also the province in which the farm centre lies given some plots are located 30–40 km far away from it. In this phase it emerged than no tenancy was a

Table 1
Main features of Veneto agriculture.

Variables	Values
No. of Farms	83,017
Total farmland area (hectares)	1098,922
Farmland area belonging to farms with tenancy (hectares)	596,492
Arable land area (hectares)	573,869
Vineyard area (hectares)	101,432
Other Fruit Tree area (hectares)	34,824
No. of Farms with animal rearing	15,994
Total farm employment (standard days)	17664,724
Non-Family workforce (standard days)	4309,692
Family workforce (standard days)	13355,032
Farmers holding a university degree (%)	7.6
Farmers older than 60 (%)	58.8

Source: [43].

full tenancy, a situation that Italy shares with other countries [44]. In fact, we received confirmation that all the tenants owned at least a small portion of the farmland they managed, in which the farm centre was located.

2) A screening was performed to eliminate famers who had signed contracts among family members or relatives. Indeed, the rent and other features of these contracts very often depart from the lease market conditions, reflecting particular interests within the family group.
3) Cases were selected randomly within the three strata, and preliminary informed consent was obtained from all participants in our survey.

At the end of the survey 56 questionnaires were collected, which produced 231 lease contract cases. One tenant-related questionnaire, accounting for only one lease contract, was eliminated because of unreliable data, leaving 55 tenant-related cases and 230 lease contract cases available for the analysis. According to the research goals and the methods employed to achieve them, different sample or sub-sample sizes were used, as is shown in Fig. 1.

3. Results and discussion

3.1. Survey sample features

Details of the surveyed farms and lease contracts are reported in Tables 2–6, where features are indicated in the same way as they are used in the two types of regression models presented in Tables 7–11.

Focusing on the tenants' sample, we first note that females are almost absent. Farmers are mostly middle-aged men, younger than the majority of Veneto farmers and less than one sixth has a university degree, i.e., a share that is more than double the regional datum (Table 1). About half of the farmers employ family members or hired workers full-time and a quarter of them admit to having some debts, indicating a propensity for risk higher than what is commonly ascribed to farmers, who rely predominantly on self-financing.

All features relating to farm size show a wide variability. Some of their distributions show a significant positive asymmetry and few are affected by a relevant degree of kurtosis. The mean of total farm area is rather higher than the regional mean (7.89 ha). The share of rented land is over 50% on average, however the sample encompasses a wide range of situations: from the case where tenancy makes only a small contribution to the farmland to that where almost all production relies on rented land, also by leasing more than 20 plots of land. The number of contracts per tenant (on average 4.3) is lower than the number of rented plots, given that some lease contracts are related to multiple plots. The large number of tractors leads us to suppose some cases of machinery overcapacity.

Land values reflect the high variability of land prices that can be found in Veneto agriculture [23]. The agricultural production of the Veneto Region appears well represented by the sample: more than one third deals with animal rearing of different species (mainly bovine) and the presence of labour-intensive crops (fruticulture and viticulture) relates to 56% of farms, while the others are focused

Table 2
Statistics of tenants' sample – numerical variables.

Variables	Mean	Median	St. Dev.	Min	Max
Farmer's age (years)	49.0	51.0	11.4	24	75
Total farmland area (hectares)	40.2	34.0	29.4	5.0	126.7
Farm rented area (hectares)	24.5	14.0	24.4	1.2	109.2
Percentage of rented area on total area (%)	54.8	51.9	26.9	11.4	96.5
No. of rented plots	5.4	5.0	4.2	1.0	25.0
No. of tractors	5.7	5.0	4.3	1	27
Land value of the owned land (euros per hectare)	77,350	60,000	48,000	25,000	190,000

No. of cases: 55.

Table 3
Statistics of tenants' sample – categorical variables.

No.	Variable	Categories	Percentage (%) of study cases
1	Tenant's gender	Male	96
		Female	4
2	Family members (besides the farmer) working full-time on the farm	Yes	49
		No	51
3	Hired workers working full-time on the farm	Yes	53
		No	47
4	Tenant's level of education	University	15
		High School/Lower	85
5	Presence of intensive crops	Yes	56
		No	44
6	Presence of animal rearing	Yes	35
		No	65
7	Debts	Presence	25
		Absence	75

No. of cases: 55.

Table 4
Statistics of the Lease Contract Sample (all cases) – Numerical Variables.

Variables	Mean	Median	St. Dev.	Min	Max
No. of plots per lease contract	1.33	1.00[a]	0.81	1.00	6.00
Contract area (hectares)	5.67	4.00	5.53	0.23	27.00
Percentage of contract area on total rented area (%)	23.6	16.6	22.6	1.2	100.0
Residual contract duration (years)	2.7	2.0	2.6	0.1	20.0
Distance of the contract area from the farm centre (km)	3.43	2.0	4.80	0.01	40.00
Contract rent (euros per hectare)	757	700	336	200	2000
Land value of the rented land (euros per hectare)	62,586	45,000	43,500	23,000	210,000

No. of cases: 230.
[a] 65% of the contracts relate to only one plot.

Table 5
Statistics of the Lease Contract Sample (all cases) – Categorical Variables.

No.	Variable	Categories	Percentage (%) of study cases
1	High interest in the rented land	Yes	36
		No	64
2	Investments in the rented area	Yes	15
		No	85
3	Intensive crops in the rented area:	Presence	22
		Absence	78
4	High land leasing availability in the neighbourhood	Yes	23
		No	77
5	High land sale availability in the neighbourhood	Yes	35
		No	65

No. of cases: 230.

on cereals (mainly wheat and maize) and industrial crops (soybean and sugar beet). All these elements indicate a sample characterised by a relevant presence of farms with medium-high economic dimension.

Most of the contract-specific features are highly variable (Table 4. We also find remarkable positive asymmetry and kurtosis for the distributions of the number of plots per lease contract, the contract area and distance from the farm centre. Although the majority concern only a single plot of land, some include multiple reciprocally separated plots. Land under contract spans from very small vineyard plots to quite large arable surfaces, with an average weight on the total rented area of almost 24%. Most of the contracts are short-term. 3% expire in one year, 69% last 5 years or less and 9% are long-term (15 years and more) and in general refer to plots with perennial crops. The residual duration is on average 44% of the established duration, with some contracts expiring a few days after the survey time and others lasting more than a decade. Most of the rented land is quite close to the farm centre. We find either cases of plots very near to where the farm centre is situated or, on the contrary, rented land sited several kilometres away from it.

Both the rent and the value of the rented land exhibit lower variability in comparison with other features. Their values reflect the crops that are cultivated on the plot and its soil productivity (fertility, irrigation) as well as aspects of the demand (e.g., the need to spread animal manure on it). On average the rent incidence on the land value is a little more than 1%.

Concerning other aspects (Table 5), we observe that tenants have made investments on the land in one sixth of the contracts and more than one third consider it as highly important for the farm management. Intensive crops are rather common among the lease contracts (22%). The "yes" frequencies of the last two variables, which reflect the opinion of the tenant on the feasibility of renting or buying agricultural land in the neighbourhood of the land under contract, seem to indicate a lower competition among farmers for purchasing rather than renting land.

3.2. WTA_P and WTA_{NL}

A first analysis (Step 1 in Fig. 1) reveals that 47.3% of the sampled tenants did not attribute any value to either PR; the other 52.7% rated the DFTPR and 47.3% rated the TPRCR. The difference between the last two percentages seems rather low, considering that the TPRCR was available to tenants 35 years later than the DFTPR.

All farmers who evaluated the TPRCR also evaluated the DFTPR. This implies that the number of contracts related to tenants who evaluated at least one PR is 127 for the DFTPR, and 117 for the TPRCR. For the former right the evaluation relates to 59% of contracts, while, for the latter, 55% of contracts.

Farmers who evaluated the rights behaved differently in terms of the number of contracts for which WTA was expressed. Among them, one third set both WTA_P and WTA_{NL} for all the contracts they hold, while the others did it only for a portion of their contract portfolio, and 27% rated only one contract. Likewise, the share of PR evaluation within the contract portfolio varies. Some tenants evaluated only one contract in 8 or one contract in 6; on the contrary others gave a value to PRs for all the contracts but one. This

Table 6
Descriptive statistics of contract sample survey – WTA (euros per hectare).

	WTA_P	WTA_{NL}
Mean	6509	4307
Median	5000	3000
St. Dev.	5355	4373
Min	300	200
Max	20,000	20,000
Asymmetry	0.869	1.716
Kurtosis	0.105	3.624
No. of cases	75	65

behaviour is translated in the number of contracts with positive PR value, which is reported in Table 6. All the contracts for which the interviewee expressed a WTA_{NL} also obtained a WTA_P, except for two cases. Consequently, we rely on only the rating of WTA_P for 12 contracts.

From this detailed picture we can draw the following hypothesis on how tenants behave in evaluating the right for a specific land under contract. It is likely that when purchasing power is limited or the cash flow available to pay rent is restricted, tenants make a double selection. First, they select plots that are more integrated with the farmland owned, and, second, those for which they are more confident to beat the third party's bid. If the plots are heterogeneous, tenants rank them in terms of PR value, according to both their features and the likelihood to succeed in exerting the right. Conversely, if the plots are homogeneous, their PRs obtain the same value per hectare.

The rate of zero-value responses to WTA questions deserves additional comments. When this survey was conceived, we did not expect such a high rate (about half of the farmers). Although some of these answers can be related to the way of asking the WTA, the presence of highly competitive third-party buyers or tenants who nullify the rights can explain this outcome. A sizable number of tenants believe that they will simply not succeed in the exerting their rights because a third party will be willing to pay more than them. This is particularly true for the DFTPR. In fact, when the rented plot is put on sale, a tenant has very frequently to compete for it with third-party neighbouring owners, who can offer higher bids than those of the tenant, due to the synergetic value of the plot on sale once it is merged with the farmland they already own [9]. But it can also relate to the TPRCR, when the tenant is already close to the maximum rent that he/she is willing to pay for the plot and in the lease market they envisage financially strong tenants who are able to make a rent bid that he/she cannot sustain.[16] We cannot exclude that, even if interviewers did their best to guarantee the privacy of the research, some farmers were reluctant to state a minimum amount of money for giving up their rights. If, on the one hand, the absence of a positive value to the rights might also be due to the lack of any rumour about effective compensation for renouncing these PRs, being a kind of reference value to elicit a proper value for the rented plot, on the other, a sort of strategic behaviour could have occurred. Indeed, in a few cases, interviewers reported a tenant's fear that requiring money to renounce the right could have implied a loss of credibility in bargaining new lease contracts not only with current but also with future landlords. However, considering the effort that was made to reassure them about the secrecy of the enquiry, we believe that a large share of the zero-WTA responses depends upon real motivations, some of which were indicated by the following logit models.

Both WTA distributions show a high variability. A certain degree of asymmetry and especially of kurtosis relates to the WTA_{NL}. The number of cases reporting WTA_{NL} below or equal to 1000 euros are almost one-third of the sample. Half of the tenants who rated the DFTPR and one third of those who rated the TPRCR show different values within their contract portfolio. There are few cases of small differences (500–1000 euros) among the values. More frequently the value gap is around 5000 and a maximum-minimum range equal to or above 10,000 euros refers to 5 cases for the WTA_P and 3 for the WTA_{NL}. The maximum value (20,000 euros) regards 3 contracts for the WTA_P and 2 for the WTA_{NL}. As an example of diversity in values within a contract portfolio, we found a tenant with four contracts who gave them the following values for WTA_P: 20,000, 5,000, 500 and zero euros. These findings indicate that some tenants are quite able to discern the PR values among their rented plots.

If we relate the WTA_P to the land value reported by the interviewees for the land under contract, the ratio ranges from less than 0.5% up to 38%. The mean and median of this ratio are 11.8% and 8.3% respectively. Both the latter ratios and the maximum ratio are considerably lower than those (17.2% and 13.1%) reported for the FNOPR [9], indicating a clear superiority of the neighbouring farm owner's PR in comparison with the tenant's PR. By referring, instead, the WTA_{NL} to the annual rent paid by the tenants, we find that the right value starts from only 20% of the rent to a multiple of forty times its value. On average, the WTA_{NL} is more than five times the rent.

Other interesting aspects emerge by comparing the two PRs in the subsample defined by the 63 cases for which we obtained both the values. The correlation coefficient between WTA_P and WTA_{NL} is 0.716 and is highly significant. The average difference between the two PRs is 2835 euros, the minimum difference is −1500 euros and the maximum difference is 16,000 euros. However only for 13% of the comparisons the gap is wider than 5000 euros. Although the DFTPR value is higher than the TPRCR value in almost 70% of the cases, for 2 contracts the TPRCR value is higher than the DFTPR and for 28% there is no difference between the values of the two PRs. The last finding, and the fact that for two contracts we got a positive value only for WTA_{NL}, are symptoms than some farmers are more interested in the continuity of the tenancy rather than in buying the land under the lease contract. They confirm the last Census data

[16] This can be particularly the case of a tenancy related to arable land, for which the outlook is a decline of the EU per hectare payments.

[43] and those reported by previous research works [31,45].

Previous values show that complexity regards also PR estimates. Economic considerations contribute to explaining the full range of WTA values collected in our survey, from zero to the maximum recorded, as well as helping to interpret the ability of a tenant to discriminate within the contract portfolio. However, if we cannot exclude that some tenants who did not state a value for the rights give them at least a small value, the use of WTA may have overestimated some PR values, especially for the TPRCR. This might particularly happen when tenants evaluate the right only for one contract within their portfolio, by converging their interest on one plot that appears to be indispensable to the farm business or for which they are highly confident to prevail over a possible third-party new tenant or buyer. In this regard it appears worth underlining the mean value of the TPRCR (4300 euros per hectare) in comparison with that of the DFTPR (6500 euros per hectare). The small gap between the two PRs may indicate that for many farmers the advantage of continuing the tenancy is not too low in comparison with that of becoming owner of a plot of land, as well as supporting our hypothesis that the time horizon for discounting the additional income from the contract renewal, though limited, it may be viewed as quite long (and, in many cases, beyond the duration of the new lease agreement).

The last considerations may be viewed as a further indication of a higher farmers' interest in managing the land through leasing contracts rather than ownership of it.

3.3. Determinants for the assessment of positive PR values

Coming to step 2 and 3 of our analysis (Fig. 1), empirical evidence indicates that some variables contribute significantly to explaining the tenant's choice to express a WTA (Tables 7–10) in the four logistic regression models. The estimated values of Nagelkerke R^2, ranging from 0.327 to 0.489, suggest that they are acceptable enough for cross-sectional data. The share of correctly classified cases is limited to 65% for the model related to WTA_{NL} expressed at the farm level, while it grows to 75% for the models related to the contract-specific WTA_P and WTA_{NL}. In attempting to insert as many independent variables as possible in the models, and considering the limited size of the sample, a 0.10 p-value level for inclusion/exclusion was adopted for the stepwise procedure.

3.3.1. Farmer/farm-related factors

The two logistic regression models presented in Tables 7 and 8 refer to the tenants' sample and include factors related to the tenant and the farm he/she manages (Tables 2 and 3). Variables influencing the choice of rating the DFTPR are almost the same as we find in the case of the TPRCR. They indicate that the propensity to positively evaluate both the rights for at least one contract depends mostly (as the Wald value shows) on the amount of farm machinery and the presence of intensive crops. These two aspects are in accordance with the farm value theory mentioned above. In fact, the farm income benefits from both maintaining an acceptable level of efficiency for farm machinery used in adequate farm size and cultivating high income fruits and especially wine grapes on it.

They suggest that on the one hand the tenant's PRs are still employed to pursue the initial purpose of the TPRCR, i.e., to guarantee the income of the direct farmers who intensively applied their work to the land, while, on the other, the two PRs are employed for the growth of the farm size, and particularly the guarantee of the economies of scale that are linked to an efficient use of the farm machinery fleet. For the TPRCR, this appears to be a new goal, completely different from that for which it was conceived.

Secondary factors that impact the choice to rate the two PRs in an opposite way are the farm rented area and number of rented plots. The negative coefficient of the former rests in the fact that the abundance of rented farmland reduces the need to compete with

Table 7
Logistic regression – Dependent variable: Tenant reporting positive WTA_P for at least one contract (1) – Tenant not reporting WTA_P for any contract (0).

Variable	B	St. err.	Wald	p-value	Exp(B)
No. of rented plots	0.285	0.145	3.837	0.050	1.330
No. of tractors	0.588	0.247	5.648	0.017	1.800
Farm with intensive crops	2.013	0.912	4.874	0.027	7.489
Farm rented area	−0.064	0.031	4.455	0.035	0.938
Family members working on the farm full-time	−1.214	0.719	2.850	0.091	0.297
Constant	−3.451	1.472	5.493	0.019	0.032

No. of cases: 55; Correct classification percentage: 72.7%; Nagelkerke R^2: 0.489.

Table 8
Logistic regression – Dependent variable: Tenant reporting positive WTA_{NL} for at least one contract (1) – Tenant not reporting WTA_{NL} for any contract (0).

Variable	B	St. err.	Wald	p-value	Exp(B)
No. of rented plots	0.213	0.121	3.096	0.078	1.237
No. of tractors	0.423	0.198	4.581	0.032	1.527
Farm with intensive crops	1.723	0.799	4.644	0.031	5.600
Farm rented area	−0.049	0.026	3.565	0.059	0.952
Constant	−3.323	1.221	7.407	0.006	0.036

No. of cases: 55; Correct classification percentage: 65.5%; Nagelkerke R^2: 0.383.

other tenants to maintain a portion of it as part of the total farmland and, consequently, the importance of exercising the tenant's PRs. The positive coefficient of the latter may depend on the increased probability that the larger the number of rented plots is the more likely it is to find at least one with some interest for the farmer, worth being considered for the exercise of the PRs and for which he/she may prevail over the third-party's bid. In the case of the DFTPR, the presence of full-time family workers seems to affect the propensity to rate the right negatively, though the significance of the coefficient is rather low.[17]

Other variables do not seem to impact the evaluation of the PRs too much.[18] Therefore, these two models show that the general propensity to rate positively the two PRs is much more affected by some structural rather than farmer-related factors (age, education).

3.3.2. Lease contract-related factors

This analysis was performed by considering the subsample of contracts related to tenants who evaluated at least one PR within their contract portfolio, that is 127 for the DFTPR, and 117 for the TPRCR. Tables 4 and 5 provide variables from which those included in the two presented models (Tables 9 and 10) are selected.

First, we can observe that the share of the lease contract area on the total rented area, rather than its simple area, has the most significant influence on the propensity of attributing a positive value to both the PRs. It is clear that tenants are more inclined to positively evaluate the right on a sizeable plot than on a negligible one, in relation to the total rented area: the absence of the former or the latter has a very different impact on both farm organization and income. By recalling a finding from the two previous logit models (Tables 7 and 8), we can sustain that, if tenants are induced to evaluate one or more PRs by an increased number of rented plots, they select to evaluate especially those bearing high levels of synergy and integration with their business.

Likewise, the contract residual duration favours the PR evaluation, although to a lesser extent.[19] On the one hand, we can argue that the longer this duration is, the higher is the probability for the tenant to successfully exert his/her PRs, on the other, we can presume that tenants attempt to negotiate longer duration for contracts related to plots that they retain more profitable for the farm business. It is also reasonable that for vineyard and orchards plots for which the asset depreciation is difficult to assess [46], because their productive life may extend beyond the contract period, the tenant prefers to take an advantage by exercising the PRs, rather than dealing with the landowner on the indemnity to which he/she is entitled at the end of the contract.

According to our expectations, a high tenant's interest in the plot and the presence of investments he/she had made in the rented land are further aspects to support the PR evaluation, the former for the TPRCR, the latter for the DFTPR. Indeed, these factors affect both the choices to rate the rights. However, because of the significant correlation between them, only one can be included in the logistic regression. Although the law provides a tenant an indemnity for investments made by him/her on the plot at the end of the lease contract, which is defined by the increment of the land value due to the investments [29], it seems that tenants prefer to benefit from the investment they had made by becoming owner of the land and consequently positively appreciate the DFTPR. This is true

Table 9
Logistic regression – Dependent variable: Contract with WTA_P (1) – Contract without WTA_P (0).

Variable	B	St. err.	Wald	p-value	Exp(B)
Percentage on rented area	0.059	0.017	11.534	0.001	1.060
Residual duration	0.233	0.105	4.964	0.026	1.262
Investments in the rented land	1.116	0.520	4.598	0.032	3.052
Constant	−1.537	0.444	12.005	0.001	0.215

No. of cases: 127; Correct classification percentage: 75.6%; Nagelkerke R^2: 0.327.

Table 10
Logistic regression – Dependent variable: Contract with WTA_{NL} (1) – Contract without WTA_{NL} (0).

Variable	B	St. err.	Wald	p-value	Exp(B)
Percentage on rented area	0.058	0.017	11.490	0.000	1.0602
Residual duration	0.208	0.099	4.394	0.036	1.232
High interest in the rented land	0.926	0.455	4.135	0.042	2.524
High land leasing availability in the neighbourhood	1.116	0.527	4.489	0.034	3.052
Constant	2.003	0.516	15.063	0.000	0.135

No. of cases: 117; Correct classification percentage: 75.2%; Nagelkerke R^2: 0.349.

[17] This might depend on the fact that farms based on a consistent stable family workforce can be more resilient than others to the loss of a specific rented area, by successfully replacing it with another. However, this remains a simple hypothesis to be confirmed.
[18] The presence of debts would have been the next variable to be included in the first model. However, it shows a significant correlation with the no. of tractors.
[19] The contract total duration is correlated to its residual duration, but it is less significant in both the logistic models.

particularly for fruit tree plants and vineyards, for which planting can be quite expensive and the economic life spans from 13 to 14 years (peach tree) to 40 and over (vineyard).

The propensity to indicate a value for the TPRCR seems also to be affected by high opportunity to find land for rent in the same area where the contract plot is situated. This factor is linked to both the second and third components of the PR value. In fact, the reduction in competition with other farmers and the consequent increase in the possibility to succeed against new entrants who will not offer a too high rent for the land under contract or for similar plots may explain this outcome, given that third-parties may find other similar plots by paying lower rents than what would be required to displace the current tenant from his/her plot. It is worth noting that the model about WTA_P does not include the high land availability for sale in the neighbourhood as a factor that increases the probability to rate the DFTPR. The high diffusion of farmers who hold the FNOPR and act as third party-buyers seems to nullify the impact of an abundance of farmland for sale.

3.4. Factors affecting the PR value

In step 4 (Fig. 1) of the analysis we tested the determinants of the two PRs. In performing this task, multiple regression models adopting untransformed variables were abandoned due to a consistent degree of heteroscedasticity. This problem was solved by adopting a double-log transformation, which produced the two models presented in Table 11, where, in the last column the percentage WTA impact[20] of each covariate is also reported. The estimates are statistically acceptable. The models show by chance an equal determination coefficient; however, they are quite different in terms of independent variables. The adjusted R^2 is comparable to that obtained in the regression model for the FNOPR value [9]. The reported statistics for Breusch-Pagan's test confirms no rejection of the homoscedasticity hypothesis. Multicollinearity among the independent variables appears very low, given that the value inflating factor is below 2 for all of them. Also, for these models, a 0.10 p-value level for inclusion/exclusion was adopted in the stepwise procedure.

All the variables used in the logit models were employed in both the multiple regression models and some significant independent variables selected in the logit regressions were also selected in these models. They are integrated by four additional variables: the tenant's educational level and age, the distance of the rented plot from the farm centre and the value of the rented land.

In the first model the number of farm/farmer-related variables included in the model is equal to the number of those contract-related, while in the second only one belongs to the latter group. Both the models share two variables: the presence of intensive crops on the farm and the presence of an investment made by the tenant in the rented land. However, this factor plays its main role in the Log-WTA_{NL} regression, being partially shadowed by the interest in the rented land in the Log- WTA_P regression, which appears to be the main driver of the DFTPR value,[21] increasing it by 148%. The presence of investments in the rented land has more than double an impact on WTA_{NL} in comparison with WTA_P, implying that the farmer aims at exploiting the investment he/she has made as long as he/she can, rather than receiving an indemnity when the contract expires. The presence of intensive crops on the farm shows instead almost the same effect in both models.[22] Farmers who are involved in the cultivation of these crops increase the farm income by

Table 11
Multiple regressions estimates.

	B	St. err.	t	p-value	% WTA impact
Dependent Variable: Log-WTA_P					
Constant	−4.401	3.045	−1.445	0.153	
Investments in the rented land	0.560	0.273	2.052	0.044	71.45
Tenants educational level: university	0.783	0.270	2.897	0.005	112.65
High interest in the rented land	0.926	0.221	4.181	0.000	146.80
Log of value of the rented land	0.813	0.220	3.688	0.000	81.30
Log of no. of tractors	0.507	0.143	3.558	0.001	50.70
Log of distance from the farm centre	−0.106	0.052	−2.050	0.044	−10.60
Farm with intensive crops	0.678	0.276	2.461	0.016	91.97
Log of no. of rented plots	−0.424	0.179	−2.363	0.021	−42.40
Adj. $R^2 = 0.440$; $F = 8.279$; $N = 75$; Breusch-Pagan's test for homoscedasticity: $\chi^2 = 2.212$; p-value = 0.137					
Dependent Variable: Log-WTA_{NL}					
Constant	15.852	2.148	7.379	0.000	
Investments in the rented land	1.080	0.256	4.213	0.000	184.23
Log tenant's age	−2.362	0.562	−4.206	0.000	−236.20
Farm with intensive crops	0.715	0.291	2.453	0.017	98.32
Adj. $R^2 = 0.440$; $F = 17.760$; $N = 65$; Breusch-Pagan's test for homoscedasticity: $\chi^2 = 1.178$; p-value = 0.278					

[20] For dummy variables, this impact has been estimated according to Ref. [47].

[21] The correlation coefficient between the interest in the rented land and the presence of an investment made by the tenant on it is 0.316 for the Log-WTA_P model and 0.462 for the Log-WTA_{NL} model. This explains why the two variables coexist in the former model, while in the latter only the presence of investment is included, which also has a higher correlation coefficient with the dependent variable.

[22] It is worth noting that the presence of intensive crops on the rented plot, although significantly correlated with Log-WTA_P ($r = 0.277$), is not included in the first model, because it shows high significant positive correlation with the value of the rented land ($r = 0.551$), the presence of intensive crops on the farm (0.450) and negative correlation with the no. of tractors ($r = -0.652$).

additional land, no matter if they achieve it by becoming owners or remaining tenants.

The estimate for DFTPR is also influenced by other two farm-related variables, which have an opposite effect on it: the number of tractors and the number of rented plots. About the former, we can observe that the distributing of machinery fixed cost is one of the crucial causes of scale economies. Farmers can better achieve this goal by transforming a part of the land they manage from tenancy to ownership. This variable has to be considered a proxy for the farm size. In fact, a similar role would also be played by the total farm area, but its high correlation with the number of tractors prevents its selection in the model. On the contrary, since the number of rented plots increases the likelihood that a tenant evaluates at least one PR (Table 7), it decreases the advantage of becoming owner of one specific plot, in relation to its limited contribution to the stability of the farm income.

The value of this right appears also to be determined by other two contract-related variables, the value of the rented land and distance from the farm centre. Their effects on the right are opposite, in accordance with our expectation. The former reflects the land quality and incorporates part of the expected income flow deriving from the plot. Its impact on WTA appears to be lower than the impact reported on the FNOPR (about 100%) [9], implying that a given percentage variation on the land value is not fully translated into the same percentage variation in the DFTPR value. The latter increases the cost of cultivation of the plot and may reduce the farmer's control over the product cropped on it. As we can see, the farmland value and the other structural factors are relevant only for the DFTPR. In fact, once the tenant has become owner, these variables will impact both the total farm asset value and the long-term efficiency of the farm business.

Two tenant's features included in the models affect the estimates of the two rights, but in an opposite way. The farmer's university educational level increases the Log-WTA_P, while his/her age has a heavy negative impact on Log-$WTA_{NL.}$ Having a university degree increases the DFTPR value by more than 110%, likely because the tenant's acquired knowledge gives him/her additional tools to increase productivity and the income of the land. However, as a long-term investment in human capital, this factor can be adequately applied only if the land can be purchased by means of the DFTPR and not simply rented.

On the contrary, a 10% increase in age determines a more than double percentage decrement in the TPRCR value, and the role of this variable seems to be the main difference between the two models. This finding seems to contradict the positive effect of age in increasing the FNOPR value [9]. However, we have to consider that the latter right gives farmers the opportunity of expanding his/her property, and was interpreted as a possible way to invest savings that farmers have accumulated during their career. When, instead, the renewal of the lease agreement is concerned, the tenant's aging heavily reduces both willingness to compete for continuously cropping a not owned land and the time horizon for considering the additional income from it.[23] As he/she approaches retirement age, the importance of prolonging the lease agreement declines quickly.

The contract rent, which shows significant association with Log-WTA_{NL} ($r = 0.354$), is not included in the model because it exhibits significant correlation with the presence of intensive crops ($r = 0.680$) and investment in the rented land ($r = 0.395$). Moreover, the presence of animal rearing in the farm business exhibits significant correlations with the dependent variables ($r = -0.446$ for the Log-WTA_P and $r = -0.337$ for the Log-WTA_{NL}); however, its wide negative correlation with some other factors (high interest in the rented land and investments on it) excludes this variable from both the models.

Previous results may be partially affected by sample features and variable specification. For example, the exiguous number of female tenants did not allow any gender effect to be shown, which was found to be significant in the analysis of the FNOPR [9]. Also, replacing the simple presence of animal rearing with the dimension of this production could have had a different impact on the regression models.

In comparison with the regression model reported for the FNOPR [9], the role of farmer-related variables is rather limited in determining the PR value. Likewise, the stability of the farm workforce does not show the role played in affecting the FNOPR value. These aspects may be related to important differences in the two survey samples, but may also indicate that tenant farmers are much more interested in the efficiency of the business than on maintaining the permanence of the family business.

The two multiple regression models have shed some light on the high variability of WTA values (from small amounts of money to large sums) expressed by tenants. They supply the impact on WTA of some factors already included in the logit models and add some others. However, we have to consider that in determining PR values some personal aspects (perceptions) may also intervene, or 'intangible' assets such as propensity to risk, capacity to insert the farm in its region, etc. [33]. These features do not impact only the income generated by the rented plot, the time prospect and discount but also the second component of the PR value, namely the expectations on possible third parties' bids and then the probability the tenant has to prevail in the case of land purchase or contract renewal. This observation may also apply to the previously described logit models.

4. Conclusion

Although the literature review does not suggest a consolidated theoretical background for explaining the values of both the rights and reasons that induce tenants to positively rate them, empirical findings have resulted as coherent with the conceptual framework we have proposed.

As previous sections have shown, evaluating the two tenant's PRs provided by Italian legislation is a complex task. Nevertheless, the three research goals, i.e., reliable PR values, factors affecting the choice to rate the PRs and the determinants of PR values, are

[23] No significant correlation exists between the tenant's age and the WTA_P. This seems to imply that the willingness to compete to become owner of a plot of land does not decline with age as the willingness to compete to maintain a lease agreement does. The desire to leave the land property as inheritance is likely the reason for the different outcome.

achieved in a satisfactory way.

For this reason, the main strengths of our research lie in a revised concept of the DFPTR and a completely new picture of the TPRCR, which widen the knowledge of a scarcely investigated agricultural policy tool, the PR.

In the end, we underline five points, which appear to be the most remarkable in contributing to the economics of both the farm tenancy and the PR applied in agriculture.

1. Lease contracts appear to be increasingly preferred to land purchases in securing the farm business viability. This result is grounded in all four steps of our analysis and particularly in: a) the number of tenants who rate the TPRCR is only slightly less than those who rate the DFPTR, although the former only has been implemented since 2001; b) the limited difference between the average values of two rights, which indicates that tenants are more focused on the continuity of the tenancy rather than becoming owners of the land under contract.
2. Tenants evaluate their PR on the sale of their rented land comparatively less than neighbouring owner farmers do for their PR on the sale of a plot adjacent to their land, according to the high synergetic value of this plot. The lower importance they attribute to the DFTPR derives also from the fact that about half of our sample farmers do not give it a positive value, while all the neighbouring owner farmers have positively rated the FNOPR [9].
3. Tenant's PRs favour the growth of farm size not only by securing plots with labour intensive crops but also guaranteeing adequate economies of scale linked to the use of farm machinery.
4. The synergetic value of a rented plot for the farm business, which increases with the percentage of the contract area on the total rented area, is the main factor that induces tenants to evaluate the PR of a specific land under contract;
5. Along with farm size and intensive crops, a tenant's interest in the rented plot positively impacts the value of DFPTR, while investments made in it positively affect the value of the TPRCR.

The results from our explorative survey can contribute to the debate on the use of PR in agriculture as a policy tool. The following comments are focused on Italian agriculture, but they can also be worth considering in other countries where PRs are available to famers and the discussion on them is open.

A first comment relates to role of the DFTPR. As we pointed out before, it is clear that the FNOPR is nowadays more important for farmers than the DFTPR. Therefore, if in the past, the farmer's access to land property was considered more crucial than the size increase in Italy, leading the DFTPR to be politically favoured over the FNOPR, the current situation of Italian agriculture is featured by a renewed trust in the farmland lease market among operators and the increased use of the DFTPR as a device to dribble the exercise of the FNOPR. Forty years have passed since the General Law on Agrarian Contracts (1982), which *de facto* put an end to the prorogation of the old tenancies and to the adoption the Equo Canone as a tool to determine the lease rents. Landlords have been increasingly inclined to rent their land and the number of tenants who consider the lease agreement as a cheaper way to enlarge their cropping area in comparison with the purchase of land has grown continuously [23]. The attainment of the rented land in the case of sale appears less important than in the past, as farmers will continue the tenancy with the new owner or will easily find other plots of land for rent. For these reasons, agricultural policy should resolve the conflict between the DFTPR and FNOPR, choosing which to favour. If, as the recent extension to the professional farmer seems to indicate, the political preference goes to the latter, the DFTPR should be limited to special cases, such as full tenant farmers or other specific situations where its absence may compromise the farm viability. Restrictions in the DFTPR beneficiaries find additional support in the TPRCR, which increases the farm business stability, although the availability of farmland for rent reduces its importance as a tool to stabilize the farm structure. Moreover, in order to achieve this goal, fiscal incentives for both tenants and landlords to stipulate longer-term lease agreements may be more effective than the use of TPRCR. In fact, longer-term leases can better guarantee young people or new farmers knowledge and skill without the concern of missing their investment in the land and, at the same time, can be a valuable tool to give them access to land by making available a cheaper alternative than buying it [46].

However, a different viewpoint seems worthy of attention. Indeed, our research stresses the role of partial tenancies, which employ both owned and rented land in shaping their structure. It confirms also for Italy what was already observed in the past not only in some western European countries [48], but also in Eastern Europe[24] [45], i.e. that farmers want to invest in technology and farm-specific resources rather than allocating large amounts of money in farmland purchases. If we agree that tenancy may be the means through which farm size becomes efficient [49], we can reconsider the role of the DFTPR in partial tenancies. Rather than being an old tool aimed at supplying land to small farms, it appears to be employed in consolidating the farm size achieved by lease arrangements, backing the FNOPR in the same aim of guaranteeing farmers the ownership of adequate land. Likewise, the TPRCR can be viewed as an aid to achieve the same goal when the landlord does not want to sell the land and long-term agreements are not feasible.

Of course, as a pioneering investigation, our work has some limitations. Among them, the following list seems particularly worth underlining:

1. The conceptual framework cannot be considered exhaustive. It can be viewed as a useful starting point for the interpretation and discussion of the results, but it can be integrated with other contributions, such as, e.g., elements from the option theory.

[24] Considering farm data from Hungary, Swinnen and Vranken [45] indicate that farmers combine purchasing and renting farmland as their favoured growth strategy, with bigger family businesses both purchasing and renting more farmland.

2. Some shortcomings refer to the survey features and the variables employed. In fact, although we defined the main factors that determine the decision to state a value for renouncing the PRs and that affect the level of this value, the fitness indicators of all the models reveal that some important aspects were not covered by the survey. By means of a broader sample we would likely include other features in the models and a different specification of some independent variables might have improved their interpretative capacity.
3. Some of the factors involved in influencing the PR are personal and only partially achievable from a traditional investigation based on a questionnaire focused mainly on structural and economic aspects. The role of neighbouring farmers as third-party buyers has been speculated but not fully ascertained.
4. The omission of some psychological/sociological factors in both types of regression model seems to be another important limitation, suggesting that the PR issue may be better handled by a wider and more comprehensive approach, which also includes contributions from other science fields.
5. The survey has completely neglected the case of the full tenant farmer. In fact, we can argue that the results could have been quite different if the survey sample had also included full tenancies rather than just partial tenancies. However, in Veneto as well as in other Italian regions, real full tenancies are currently scarcely represented, given that most of those which are defined in this way are simply devices to allow farmer's sons or daughters to benefit from the subsidies the EU legislation grants young farmers without subtracting the land ownership from their parents.
6. The research deals with the PR issue from the side of right-holders, ignoring the landlord's and third-party's viewpoints and valuations. Paying attention also to these actors involved in the PR exercise would have improved the economic comprehension of the two PRs.
7. A further limitation can be found in the way the CV has been applied. Some of its critical points we have mentioned might be eliminated or reduced by combining open-ended questions with the BDM auction method [50].

Indeed, the results from our survey can be considered promising for further studies on PRs in agriculture. Future research should not only deal with the previous limitations, but also deepen the PR issue from an economic viewpoint. In particular, we suggest three directions: a) to test the major findings of our work in other regions or countries where tenant's PRs are widespread; b) to investigate how farmers who are at the same time owners and tenants evaluate both the DFPTR and FNOPR for specific plots of land; c) to focus on the presumed efficiency loss associated with PRs granted to some types of farmers [51], which is a topic that can help to better evaluate PRs as a tool of agricultural policy.

Author contribution statement

LUIGI GALLETTO: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Data availability statement

Data will be made available on request.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

List of repeated abbreviations

PR	pre-emption right
NSCA	Polish Agricultural Property Agency
DFTPR	direct farmer-tenant's pre-emption right
FNOPR	farmer-neighbouring owner's pre-emption right
TPRCR	tenant's pre-emption right on contract renewal
CV	contingent valuation
WTP	willingness to pay
WTA	willingness to accept
WTA_P	willingness to accept a compensation for renouncing to the DFTPR
WTA_{NL}:	willingness to accept a compensation for renouncing to the TPRCR

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