An Economic Analysis of Rights of First Refusal

by

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Abstract

This paper examines the value of first refusal rights and first offer rights. A first refusal right requires the owner of a property to offer it to the rightholder on the same terms as those offered by a third party before the owner can sell the property to that third party. A first offer right permits the rightholder to make an offer for the property; if the owner does not accept that offer, she may sell the property to a third party only at a price above the one offered by the rightholder.

Under perfect information, first refusal and first offer rights have value if, at the time the right may be triggered, the rightholder values the property more than a third party who in turn values it more than the owner. When the owner can compensate a third party for her costs in making a bid for the property, first refusal and first offer rights have the same value. If these transaction costs are uncompensable, the value of a first refusal right increases (relative to its value under compensable costs), but the value of a first offer right is unaffected.

Imperfect information by the rightholder over the value placed on the subject property by a third party reduces the value of a first offer right and has no effect on the value of a first refusal right. Imperfect information by a third party over the value placed on the property by the rightholder has an indeterminate effect on the value of a first refusal right if transaction costs are uncompensable. It does not affect the value of a first refusal right if transaction costs are compensable or the value of a first offer right.
I. Introduction

This paper presents an economic analysis of rights of first refusal. A right of first refusal requires the owner of the property subject to the right to offer the property to the rightholder on the same terms as those offered by a third party before the owner can sell the property to that third party. A close cousin to the right of first refusal is the right of first offer. Before an owner can sell property subject to a right of first offer, the rightholder must be given the chance to make an offer for the property. The owner can then either accept the offer; or the owner can sell the property to a third party, but only at a price above the one offered by the rightholder. We will refer to rights of first refusal and rights of first offer collective as first purchase rights.

First purchase rights are commonly employed in a variety of contractual settings. They are found, among others, in real estate sale and lease contracts, in agreements among shareholders of closely-held corporations, in joint venture and franchise agreements, and in professional sports collective bargaining agreements.¹ In addition in these contractual rights, state law creates miscellaneous rights of first refusal, for example for farmers, with respect to foreclosed farm property; for tenants, with respect to the conversion of their units into

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condominiums; and for franchisees, with respect to the establishment of certain new franchises.\(^2\)

Despite their common use, however, no paper has analyzed the factors that make such rights valuable.\(^3\)

The very existence of first purchase rights poses somewhat of a puzzle. Assume that an owner is considering the sale of a property to a potential buyer who has offered to pay $1,000,000. Even in the absence of a right of first refusal, the owner would want to contact the putative rightholder to see whether the she will offer, say, $100 more. Rights of first offer may pose an even greater quandary. Why would the owner ever want to the sell the property to


\[\text{\textsuperscript{3} For a general discussion of rights of first refusal, their uses and purposes, see David I. Walker, Rethinking Rights of First Refusal, forthcoming __ Stan. J. of L., Business & Fin. ___ (1999). For an analysis of an "option to match" (a type of first sale right) in the salt market, see Victor P. Goldberg, The International Salt Puzzle, 14 Res. in L. & Econ. 31 (1991).}\]
anyone for less than the price offered by the rightholder? This raises of issue of why first purchase rights are valuable. Is it just that the rightholder needs to pay only $1,000,000 to match, rather than $1,000,100 to beat, the potential buyer's offer?

This paper provides a framework to analyze the value of first purchase rights at the time of potential exercise. This value is important for a number of reasons. First, the factors that determine this value highlight the significance of certain features in the design of these rights, certain environmental features, and the relation of design and environmental features to each other. Second, this value determines the amount of damages payable if the right is breached. Third, by identifying the factors that determine the value of first purchase rights at the time of potential exercise, the model helps assess how much one should offer or demand for such rights at the time they are contracted for.

Part II of the paper presents a framework for analyzing first purchase rights. Part III examines the value of first purchase rights when parties have perfect information about the value each attributes to the subject property. Part IV examines the value of these rights under imperfect information. Part V concludes.

II. A Framework of Analysis

Let O be the owner of property Y, R be a person who may hold a first purchase right on Y, and T be a third party interested in purchasing Y. Let o, r, and t be the respective values that O, R, and T place on Y (where o excludes any portion of value derived from a sale of Y to R or T.) Only one term -- price -- is relevant with respect to the sale of Y and there are a large number
of parties who value Y at the same amount as does T.\(^4\)

Let \(c > 0\) be the amount of transaction costs (known to O, T and R) that T would incur if she purchases (or, in case of a right of first refusal, offers to purchase) Y.\(^5\) Let \(t^* = t - c\). While we do not formally model the effect of transaction costs incurred by R and O, we will remark on their effect.

If R does not have a first purchase right, O and R may bargain over the sale of Y to R or O may sell Y to T.

If R has a right of first refusal (RFR), O can either (i) agree to sell (subject to R’s right) Y to T or (ii) bargain with R over the sale of Y to R. If O agrees to sell Y to T, let \(p^o\) be the price which T has agreed to pay. R then has the right to purchase Y for \(p^o\). If O instead bargains with R and they fail to come to an agreement, O keeps Y.

\(^4\) This assumption does not change the qualitative results, but simplifies the derivations of \(p^o\) and \(p'\).

\(^5\) For simplicity, assume that T incurs c upon signing of an agreement with O to purchase Y (subject to R’s rights).
If R has a right of first offer (RFO), R makes an offer for Y. Let R’s offer price be $p'$. O can either (i) accept R’s offer of $p'$ or (ii) bargain with R over the sale of Y to R. If O chooses to bargain with R, O may sell Y to T only at a price $p > p'$.

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Rights of first offer sometimes specify instead that O proposes $p'$ which R may accept. If R rejects the offer, O may sell Y to T only at a price $p > p'$. As long as O is perfectly informed about R's information about $t$, these two variants lead to identical optimal offers $p'$ and identical values for a RFO.
Bargaining between R and O is modeled as R and O making alternate offers over infinite periods of time. (In a right of first offer, these offers by R are distinct from her offer of p' that affects O's right to sell Y to T.) In each period of offers, R and O incur respective costs of $r_R > 0$ and $r_O > 0$, where $r_R$ and $r_O$ are proportional to the remaining joint gain to R and O from arriving at an agreement. As shown by Rubinstein, the unique perfect equilibrium outcome to this game is R making and O accepting a first period offer that gives O a fraction $\theta$ of $g$, the joint gain of arriving at an agreement in the first period, with $\theta = 1 - (1-\delta_o)/(1-\delta_r\delta_o)$ and $\delta = 1/(1+r)^7$. The value of $\theta$ is known to R and O. $\theta$ can also be interpreted as a measure of the relative bargaining skills of R and O.\textsuperscript{8}

For purposes of Part III, assume that $o$, $r$, and $t$ are known to each of O, R, and T. This assumption will be relaxed in Part IV.

\textsuperscript{7} Ariel Rubinstein, Perfect Equilibrium in a Bargaining Model, 50 Econometrica 97 (1982).

\textsuperscript{8} For other papers assuming that gains from an agreement are split in fixed proportions, see Lucian Arye Bebchuk, An Incomplete Contracts Approach to Contractual Restrictions and Covenants (Working Paper 2000); Aaron S. Edlin & Stefan Reichelstein, Holdups, Standard Breach Remedies, and Optimal Investment, 86 Amer. Econ. Rev. 478 (1996); and Alan Schwartz & Joel Watson, Economic and Legal Aspects of Costly Recontracting (Working Paper 2000).
III. First Purchase Rights under Perfect Information

(a) Conditions under which First Purchase Rights Possess Value

When the owner, the rightholder and the third party are fully informed about the value each attributes to the subject property, first purchase rights have value only if (i) the third party values the property more highly than the owner and (ii) the rightholder values the property more highly than the third party (see Appendix, Proposition 1).

To see why, consider the case whether either of these conditions does not hold. If the owner values the property more highly than the third party, the owner would never agree on a price with the third party that would trigger a right of first refusal. Similarly, in a right of first offer, the owner would not be willing to sell the property to the third party regardless of the price offered by the rightholder. On the other hand, if the third party values the property more highly than the rightholder, the rightholder will not match the price offered by the third party (in a right of first refusal) and the third party will be willing to pay more than rightholder's offer even if the rightholder offers her reservation price (in a right of first offer).

(b) The Value of First Purchase Rights if r>t*>o

To determine the value of a first purchase right, we first need to consider whether the owner can compensate the third party for the transaction costs the third party incurs in offering to buy the subject property. In practice, agreeing to pay such compensation may result in moral hazard (the third party may incur greater costs than is efficient) or cheating (the third party may overstate her true costs). Moreover, the agreement providing for the first purchase right may restrict the owner's right to pay such compensation. We therefore examine the two polar cases,
where the owner can compensate the third party for all transaction costs without adverse effects and where the owner cannot compensate the third party for these costs.

Table 1 gives the values of a right of first refusal and a right of first offer, as well as the rightholder’s optimal offer in a right of first offer, for fully compensable and uncompensable transaction costs. (For a formal derivation of these values, see Appendix, Propositions 2 to 5.) Figures 1 through 4 give graphic presentations of these values for selected $t^*$ and $\theta$ (with $o$ and $r$ normalized to 0 and 1).

Table 1: Value of First Refusal and First Offer Rights under Perfect Information

<table>
<thead>
<tr>
<th></th>
<th>$c \geq 0$ (compensable)</th>
<th>$c &gt; 0$ (uncompensable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Refusal Right</td>
<td>Lower of $[\theta (r-t^<em>); (1-\theta)(t^</em>-o)]$</td>
<td>$(1-\theta)(t^*-o)$</td>
</tr>
<tr>
<td>First Offer Right</td>
<td>Lower of $[\theta (r-t^<em>); (1-\theta)(t^</em>-o)]$</td>
<td>Lower of $[\theta (r-t^<em>); (1-\theta)(t^</em>-o)]$</td>
</tr>
<tr>
<td>Optimal $p'$</td>
<td>$t^*$</td>
<td>$t^*$</td>
</tr>
</tbody>
</table>

(i) Compensable Transaction Costs

If transaction costs are compensable, rights of first refusal and rights of first offer have the same value. The value derives from their effect on the owner's options other than to arrive at a negotiated agreement with the rightholder (that is, an agreement reached other than through the execution of the first purchase right). Without a first purchase right, the owner can sell the
subject property to a third party and thereby withhold ownership of the property from the rightholder. This option is not available when the rightholder has a first purchase right. If the rightholder has a right of first refusal, that right entitles her to match a price offered by any third party and buy the property. Similarly, in a right of first offer, an offer of $t^*$ (a price that no third party would be willing to top), would prevent the owner from selling the property to a third party.

The option to sell the subject property to a third party and thereby withhold ownership of the property from the rightholder can be valuable to the owner even though the rightholder values (and would thus be willing to pay for) the property more than any third party. The owner and the rightholder will bargain “in the shadow of” the rightholder’s first purchase right. The owner's remaining alternatives to reaching a negotiated agreement with the rightholder are: (i) to sell the property to the rightholder for $t^*$ (by triggering the rightholder’s right of first refusal, which will be exercised, or by accepting the rightholder's offer in a right of first offer) or (ii) not to sell the property at all. Compared to the option of selling the subject property to a third party for $t^*$, the first of these alternatives yields the same payoff to the owner but a higher payoff to the rightholder and the second yields the same payoff to the rightholder but a lower payoff to the owner. In a negotiation between the owner and the rightholder, where the outcome depends on the payoffs to each side when no agreement is reached, a first purchase right therefore

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9 We ignore throughout the possibility that the rightholder may buy the property from a third party after the third party acquired it from the owner as it is unlikely that any third party who values the property more highly than the owner would sell the property to the rightholder for less than the owner would have sold it.
strengthens the rightholder’s bargaining position.

First purchase rights have no value if either the owner or the rightholder could make a take-it-or-leave-it offer (equivalent, in our notation, to $\theta=1$ and $\theta=0$, respectively) (see Figure 2). If the owner can make a take-it-or-leave-it offer, she can sell the property to the rightholder at the rightholder’s reservation price regardless of the presence of a first purchase right. In that context, the owner’s payoff absent a negotiated agreement with the rightholder is irrelevant. Similarly, if the rightholder can make a take-it-or-leave-it offer, she will, regardless of the presence of a first purchase right, never pay more than $t^*$, the most the owner could realize if the rightholder does not purchase the property.

Although not formally modeled, Table 1 can also elucidate the effect of transaction costs incurred by the rightholder and the owner. Transaction costs by the rightholder have an effect equivalent to lowering her valuation of the property by the amount of such costs. Transaction costs incurred by the owner in making an agreement with a third party have an effect equivalent to compensable transaction costs incurred by the third party in making such an agreement. Transaction costs incurred by the owner in selling the subject property to the rightholder have an effect equivalent to raising the value the owner attributes to holding the subject property.

(ii) Uncompensable Transaction Costs

If transaction costs are uncompensable, a right of first refusal can be substantially more valuable (Figures 3 and 4). Uncompensable transaction costs effectively render the subject property unmarketable to any third party because no third party will incur such costs when she is sure that the rightholder will exercise her right of first refusal. Uncompensable transaction costs
thus deprive the owner of the first of the remaining alternatives described above, that is, of triggering a right of first refusal (that the rightholder will exercise) by striking an agreement with a third party to sell the property for $t^*$. The owner's sole alternative to reaching a negotiated agreement with the rightholder is not to sell the property at all. This causes a further deterioration in the owner’s bargaining position and the right of first refusal becomes correspondingly more valuable. Here, the value of a right of first refusal is highest when the rightholder can make a take-it-or-leave-it offer ($\theta=0$), which would enable the rightholder to acquire the property for the value the owner places on the property if it cannot be sold (Figure 4).

That transaction costs are uncompensable, however, does not affect the value of a right of first offer. Rights of first offer retain value only if the rightholder makes an offer that is sufficiently high to prevent the owner from selling the property to any third party. Thus, the rightholder will have to offer to the owner $t^*$, a price at least as high as the price a third party would be willing to pay. The owner thus retains the option of selling the property for $t^*$ to the rightholder.

IV. First Purchase Rights under Imperfect Information
This Part models the effect of imperfect information on the value of first purchase rights. For each right, one type of information imperfection is analyzed. For rights of first offer, we model imperfect information by the rightholder about the value of the subject property to a third party. For rights of first refusal, we model imperfect information by a third party about the value of the subject property to the rightholder. We focus on these imperfections because the information at issue relates to decisions that are specifically affected by the rights. In a right of first offer, the rightholder has to decide at what price to make an offer. In a right of first refusal, the third party has to decide whether to enter into an agreement that is subject to a right of first refusal. By contrast, the owner's decisions, the rightholder's decisions in a right of first refusal, and the third party's decisions in a right of first offer are not specifically affected by the information at issue.

(a) Imperfect Information by the Rightholder

Assume that R does not know \( t^* \), but knows that \( t^* \) is uniformly distributed between \( t_H \) and \( t_L \) with \( r_{t_H} > t_L \).\(^{10}\) The expected value of \( t^* \) is thus \( \_ = (t_H + t_L)/2 \). After R makes her offer, the actual value of \( t^* \) becomes known to all parties.

Table 2 gives the optimal offer \( p' \) and the expected value of a right of first offer (for optimal offers) depending on the relationships between \( t_H, t_L, o, r \) and \( \theta \). (For a proof, see Appendix, Proposition 6.) Figures 5 and 6 give graphic presentations of these values for selected combinations of \( t_H \) and \( t_L \) (with \( \theta = .5 \) and \( o \) and \( r \) normalized to 0 and 1).

\(^{10}\) The value of a right of first offer conditional on \( t^* > r \) and \( t^* < o \) is 0. The possibilities that \( t^* > r \) and \( t^* < o \) will also not affect the rightholder's optimal offer since the amount of the offer is irrelevant for \( t^* > r \) and \( t^* < o \).
Imperfect information by the rightholder over the value of $t^*$ reduces the value of a right of first offer. The value of a right of first offer declines because the rightholder can make two types of mistakes. She can make an offer below the amount a third party would be willing to pay ($p' < t^*$), in which case the right loses its value (since the owner would become able to sell the subject property to a third party for $t^*$). Or she can make an offer above the amount a third party would be willing to pay ($p' > t^*$), which may result in the owner accepting the offer and the rightholder paying more for the property that she would under perfect information. The rightholder sets her offer to minimize the expected losses from these mistakes.

The optimal offer for the rightholder, and the value of the right of first offer, depend on the relationships between $t_H$, $t_L$, $o$, $r$ and $\theta$. In some cases, the marginal losses to the rightholder from an offer below $t^*$ exceed those from an offer above $t^*$ for any offer below $t_H$. That may be true either because the rightholder gains a lot from foreclosing the owner's option to sell to a third party (Table 2, Line I) or because the owner's bargaining position even if she cannot sell the property to a third party is so strong that the owner will reject even an offer of $t_H$ (Table 2, Line IV). In that case, it is optimal for the rightholder to make an offer of $t_H$.

In the former case (Table 2, Line I), the owner accepts the rightholder's offer. The value of the right is the difference between what the rightholder would have expected to pay in the absence of a right and her offer of $t_H$. Imperfect information renders the right less valuable
because the rightholder makes a higher offer than she would under perfect information (reflected in the subtraction of \((t_H - _)\) -- the difference between the rightholder’s offer and the average offer the rightholder would have made with perfect information -- in the value of the right).

In the latter case (Table 2, Line IV), the owner rejects the rightholder’s offer. The value of the right lies in foreclosing the owner’s option to sell to a third party. (See Figure 5, \(t_H < .5\).) Since the rightholder's offer is always foreclosing and is not accepted, imperfect information does not reduce the value of the right.

Conversely, the marginal losses to the rightholder from an offer above \(t^*\) may exceed those from an offer below \(t^*\) for the relevant range of offers. Then, it is optimal for the rightholder to make an offer equal to the amount the rightholder would pay even if the owner could not sell to a third party (Table 2, Line III).\(^{11}\) This offer is low enough such that the owner always rejects the offer. The right of first offer is valuable if the offer turns out to be above the amount a third party would be willing to pay. If so, the value of the right lies in foreclosing the owner’s option to sell to a third party. (See Figure 5, \(t_H > .5\), and Figure 6, \(t_L < .25\).) Imperfect information renders the right less valuable because the rightholder will sometimes make an offer that is below \(t^*\) and the right loses its value.

Finally, it may be optimal for the rightholder to make an offer that is not always above \(t^*\), but is sufficiently high to induce the owner to accept the offer if the offer turns out to be above \(t^*\) (Table 2, Line II). If the offer exceeds the actual value of \(t^*\), the value of the right of first offer lies in the difference between what the rightholder would have expected to pay in the absence of

\(^{11}\) It is never optimal for the rightholder to offer less than \(o + \theta(r-o)\). The relevant range of offers over which the marginal losses to the rightholder from an offer above \(t^*\) must exceed those from an offer below \(t^*\) is thus the range between \(o + \theta(r-o)\) and \(t_H\).
a right and the rightholder's offer. (See Figure 6, $t_i > 0.25$.) Imperfect information renders the right less valuable both because the rightholder will sometimes make an offer below $t^*$ and the right loses its value; and because the rightholder will sometimes make an offer that the owner accepts and that exceeds the offer the rightholder would have made with perfect information.

In contrast, imperfect information by the rightholder would not reduce the value of a right of first refusal. Rights of first refusal are exercised after the owner and a third party have arrived at an agreement to sell. At that point, the value the third party places on the property (or the fact that the owner is unwilling or unable to induce a third party to make an agreement) will be apparent to the rightholder. That is, in a right of first refusal, the rightholder learns the relevant information (the price offered by the third party) before the rightholder has to make her decision (whether to exercise her right of first refusal), whereas in a right of first offer, the rightholder learns the relevant information (the price a third party would be willing to pay) only after the rightholder makes her decision (what to offer to the owner).

(b) Imperfect Information by the Third Party

The information set of a third party is relevant to the value of a right of first refusal if transaction costs are uncompensable and a third party values the property more highly than the owner. If transaction costs are compensable, a third party will agree to pay $t^*$ (net of compensated costs) regardless of her beliefs about the value the rightholder places on the property. If no third party values the property more highly than the owner, no agreement between the owner and any third party triggering the right can be reached.

Assume therefore that $c > 0$ is uncompensable, that $t^* > 0$, and that T does not know the
actual value of r, but knows its distribution. Let π satisfy the equality π = t - c/Pr(π>r) with Pr(π>r) being the probability that π exceeds r. Table 3 gives the value of a right of first refusal.

(For a proof, see the Appendix, Proposition 7.)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value of First Refusal Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>No π exists</td>
</tr>
<tr>
<td></td>
<td>Lower of [(1-θ)(t*-o), (1-θ)(r-o)]</td>
</tr>
<tr>
<td>II</td>
<td>o+θ(r-o)&gt;π</td>
</tr>
<tr>
<td></td>
<td>Lower of [(1-θ)(t*-o), (1-θ)(r-o)]</td>
</tr>
<tr>
<td>III</td>
<td>r&lt;π</td>
</tr>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>IV</td>
<td>o+θ(r-o)&lt;π and r&gt;t*</td>
</tr>
<tr>
<td></td>
<td>t* + θ(r-t*) - π</td>
</tr>
<tr>
<td>V</td>
<td>o+θ(r-o)&lt;π and π&lt;r&lt;t*</td>
</tr>
<tr>
<td></td>
<td>r - π</td>
</tr>
</tbody>
</table>

Imperfect information by a third party has an indeterminate effect on the value of a right of first refusal. On one hand, imperfect information may deter a third party from making any agreement with the owner or reduce the price a third party is willing to offer. To that extent, imperfect information increases the value of a right of first refusal. On the other hand, a third party with imperfect information may be willing to make an agreement with the owner in circumstances where she would not be willing to do so if she had perfect information. To that extent, imperfect information reduces the value of a right of first refusal.

These effects are illustrated in Table 3, where π stands for the amount a third party would
agree to pay given her valuation, her uncompensable costs, and her information about the value the rightholder places on the property. Where a third party would either not agree to pay any amount (Table 3, Line I) or less than the amount the rightholder would pay even if the owner could not sell to a third party (Table 3, Line II), the value of a right of first refusal lies in making the property unmarketable to a third party.

Now consider the case where $\pi$ exceeds the amount which the rightholder would pay if the owner could not sell to a third party (Table 3, Lines III, IV and V). If $\pi$ exceeds the value the rightholder places on the property (Table 3, Line III), the rightholder will not exercise her right of first refusal and the right will have no value. (The right, in this case, would also lack value if the third party had perfect information.)

If $\pi$ is below the value the rightholder places on the property, the rightholder will exercise her right of first refusal. The value of the right depends on the relation between the values the rightholder and the third party place on the property. (Recall that, with imperfect information, a third party offers less than the value she places on the property.) If the rightholder places a greater value on the property than the third party (Table 3, Line IV), the value of the right is the difference between what the rightholder would have to pay in the absence of a right and $\pi$. In this case, imperfect information reduces the value of a right of first refusal since a perfectly informed third party would not have offered to buy the property at any price.

If the third party places a greater value on the property than the rightholder (Table 3, Line V), the value of the right is the difference between the rightholder's valuation of the property and $\pi$. Absent a right (or with the right, but with the third party having perfect information), the rightholder would not have acquired the property at all. Imperfect information, in this instance,
increases the value of a right of first refusal.

Imperfect information by a third party would not affect the value of a right of first offer. In a right of first offer, it is optimal for the rightholder to offer a sufficient amount (t*) to prevent the owner from selling to a third party whenever the rightholder values the property more than the third party. The third party then has to decide whether she is willing to top the rightholder’s offer. That is, in a right of first offer, the third party learns the relevant information (the rightholder’s offer) before she has to make her decision (whether to purchase the property), whereas in a right of first offer, the third party learns the relevant information (whether the rightholder will exercise her right of first refusal) only after the third party makes her decision (whether to incur uncompensable transaction costs to agree to purchase the property). Since the decision of the third party is not affected by her imperfect information, the information imperfection will not affect the value of the right of first offer.

V. Conclusion

This paper has identified several factors that affect the value of first purchase rights. Specifically, the value of a first purchase right depends on the relative valuations of the property; on the relative ability of the owner and the rightholder to appropriate to themselves bargaining surplus; on whether the right takes the form of a right of first refusal or a right of first offer; on whether the owner can compensate a third party for the transaction costs the third party would incur in agreeing to purchase the property; and on whether the rightholder and the third party have accurate information about the value of the property to each other.

Under perfect information, first purchase rights have value only if the rightholder values
the property more than a third party, who in turn values it more than the owner. When the owner can compensate a third party for her transaction costs, first refusal and first purchase rights have the same value. This value derives from the effect of the right on the owner's options other than to arrive at a negotiated agreement with the rightholder (that is, an agreement reached other than through the execution of the first purchase right). In the presence of a first purchase right, the owner cannot sell the subject property to a third party and thereby withhold ownership of the property from the rightholder. The owner's remaining alternatives to reaching a negotiated agreement with the rightholder yield either a higher payoff to the rightholder or a lower payoff to the owner. In a negotiation between the owner and the rightholder, where the outcome depends on these payoffs, the owner will therefore end up selling the property to the rightholder for a lower price.

The fact that transaction costs are uncompensable increases the value of a right of first refusal (relative to the value with compensable transaction costs) because such costs make the property unmarketable to anybody other than the rightholder. Uncompensable transaction costs, however, do not affect the value of a right of first offer.

Imperfect information by the rightholder over a third party's valuation of the subject property reduces the value of a right of first offer. The expected value of the right declines because the rightholder will sometimes make an offer that turns out to be below the amount a third party would be willing to pay (making the right valueless); and because the rightholder will sometimes makes an offer that gets accepted and that exceeds the offer the rightholder would have made with perfect information. Such imperfect information has no effect on the value of a right of first refusal.
Imperfect information by a third party over the rightholder's valuation of the subject property has an indeterminate effect on the value of a first refusal right if transaction costs are uncompensable. Imperfect information can increase the value of a right because it can lead a third party not to make any offer or only a lower offer than the one the third party would have made with perfect information. It can reduce the value of a right because the third party may make an offer when she would not have done so with perfect information. Imperfect information has no effect on the value of a first refusal right if transaction costs are compensable and no effect on the value of a first offer right.
Appendix

Unless otherwise specified, all parties have perfect information.

Proposition 1: A RFR and a RFO do not have value unless \( r > t^* > o \).

Proof for Proposition 1: If \( o > t^* \), O will not want to sell Y to T and the presence of a RFR or a RFO becomes moot. If \( t^* > o > r \) or \( t^* > r > o \), competition among third parties insures that O could sell Y to T for \( t^* \). As \( t^* > r \), neither a RFR nor a RFO would block such a sale.

Proposition 2: If \( c \geq 0 \) are compensable, the value of a RFR is the lower of \( \theta(r-t^*); (1-\theta)(t^*-o) \).

Proof for Proposition 2: To determine the value of a RFR or a RFO, we must first establish the price \( p_F \) for which O would sell Y absent any contractual restriction.

Lemma 1: \( p_F = t^* + \theta(r-t^*) \).

Proof: Absent agreement with R, competition among third parties assures that O could sell Y to T at a net price of \( t^* \). Thus, the joint gains to O and R from selling to R rather than to T are \( g = r - t^* \). O will obtain a fraction \( \theta \) of these gains and thus sell Y to R for \( t^* + \theta(r-t^*) \).

With a RFR, O can pursue two strategies. First, O can agree to sell Y to T.

Lemma 2: If O agrees to sell to T, R will exercise her RFR and buy Y for \( t^* \).

Proof: Since T knows that R will exercise her RFR, O will have to compensate T for \( c \). Competition among third parties assures that, if O offers such compensation, T would agree to buy Y for \( t^* \) (net of compensated transaction costs). As \( t^* \leq r \), R would exercise her RFR and acquire Y for \( t^* \).\(^{12}\)

\(^{12}\) We assume here that the right of first refusal gives R the right to match T's price net of...
any compensated transaction costs.
Second, O can bargain with R threatening not to sell Y at all. The result of such bargaining are derived in Lemma 3.

**Lemma 3**: If O’s alternative to a negotiated agreement with R is not to sell Y, O will sell Y to R for \( o + \theta(r-o) \).

**Proof**: If O’s alternative to a negotiated agreement with R is not to sell Y, \( g=r-o \). O will obtain a fraction \( \theta \) of these gains and thus sell Y to R for \( o + \theta (r-o) \).

O will pursue the strategy that yields the higher sales price. The value of a RFR is given by the difference between the sale price absent contractual restriction and the higher of \([o + \theta(r-o); t^*] \), which is the lower of:

1. \( t^*+\theta(r-t^*) - [o+\theta (r-o)] = t^*-\theta t^* + \theta r - o +\theta o - \theta r = (1-\theta)(t^*-o) \).
2. \( t^*+\theta(r-t^*) - t^* = \theta(r-t^*) \).

**Proposition 3**: If \( c \geq 0 \) are compensable, the value of a RFO is the lower of \([\theta(r-t^*); (1-\theta)(t^*-o)] \).

**Proof for Proposition 3**: To determine the value of a RFO, we first have to derive the optimal \( p' \) that R will offer to O.

**Lemma 4**: A RFO has the highest value for \( p'=t^* \).

**Proof**: An offer of \( p'=t^* \) is sufficient to prevent O from selling Y to T (since T would not be willing to offer a price, net of compensated transaction costs, of \( p>t^* \)).\(^{13}\) Thus, R has no reason to offer a price \( p'>t^* \). Offering a price \( p'<t^* \) would enable O to sell Y to T for \( t^* \) (net of compensated

\(^{13}\) We assume here that the right of first offer prevents O from selling Y to T at any price that fails to exceed \( p' \) net of any compensated transaction costs.
transaction costs). Lemma 1 shows that in the resulting bargaining, O would sell Y to R for:

\[ p_F = t^* + \theta(r-t^*) > t^* \]

Any offer \( p' < t^* \) is thus not optimal for R.

We now turn to deriving the value of a RFO for \( p' = t^* \). O can pursue two strategies. Accept the offer and sell Y to R for \( t^* \). Or reject the offer and bargain with R, with O not being able to sell Y to T. Lemma 3 has shown that in the latter in case O will sell Y to R for \( o + \theta(r-o) \). O will pursue the strategy that yields the higher price. The value of a RFO is given by the difference between the sale price absent contractual restriction and the higher of \( [o + \theta(r-o); t^*] \), which as shown above is the lower of \( [\theta(r-t^*); (1-\theta)(t^*-o)] \).

**Proposition 4**: If \( c > 0 \) are uncompensable, the value of a RFR is \( (1-\theta)(t^*-o) \).

**Proof for Proposition 4**: With a RFR, T will not make a bid (and incur uncompensable \( c \)) since T knows that R will exercise her RFR. Thus, O’s only alternative to a negotiated agreement with R is not to sell Y. Lemmas 1 and 3 give the respective prices at which O would sell the property to R absent a RFR and when O’s only alternative is not to sell Y. The value of a RFR is given by:

\[ t^* + \theta(r-t^*) - [o + \theta(r-o)] = t^* - \theta t^* + \theta r - o + \theta o - \theta r = (1-\theta)(t^*-o) \]

**Proposition 5**: If \( c > 0 \) are uncompensable, the value of a RFO is the lower of \( [\theta(r-t^*); (1-\theta)(t^*-o)] \).

**Proof for Proposition 5**: See proof for Proposition 3, which does not turn on whether \( c \) are compensable.

**Proposition 6**: If R does not know \( t^* \), but knows that \( t^* \) is uniformly distributed between \( t_H \) and \( t_L \) with \( r_{t_H} > t_L \) (and \( t^* \) becomes known to all parties after R makes her offer), R’s optimal \( p' \) and the...
expected value of a RFO (if R makes the optimal offer) are as given in Table 2.

Proof for Proposition 6: The expected value of a RFO under imperfect information is equal to the expected sale price of the subject property without a RFO — \( \_ + \theta (r - \_) \) — less the expected sale price with the RFO. To prove Proposition 6, it will be helpful to prove the following Lemma:

Lemma 5: For any \( z \) with \( t_H \geq z \geq t_L \):

\[
\_ + \theta (r - \_) = \left[ \frac{z-t_L}{t_H-t_L} \right] \left\{ \frac{z+t_L}{2} + \theta \left[ r - \frac{z+t_L}{2} \right] \right\} + \left[ \frac{t_H-z}{t_H-t_L} \right] \left\{ \frac{z+t_H}{2} + \theta \left[ r - \frac{z+t_H}{2} \right] \right\}.
\]

Proof:

\[
\left[ \frac{z-t_L}{t_H-t_L} \right] \left\{ \frac{z+t_L}{2} + \theta \left[ r - \frac{z+t_L}{2} \right] \right\} + \left[ \frac{t_H-z}{t_H-t_L} \right] \left\{ \frac{z+t_H}{2} + \theta \left[ r - \frac{z+t_H}{2} \right] \right\} = \theta r + \frac{z}{2} - \theta \frac{z}{2} + \left[ \frac{z-t_L}{t_H-t_L} \right] \left\{ (1-\theta) \frac{t_L}{2} + \left[ \frac{t_H-z}{t_H-t_L} \right] \left\{ (1-\theta) \frac{t_H}{2} \right\} \right\} = \theta r + \frac{(1-\theta)}{2} \left\{ z + \left[ \frac{z-t_L}{t_H-t_L} \right] t_L + \left[ \frac{t_H-z}{t_H-t_L} \right] t_H \right\} = \theta r + \frac{(1-\theta)}{2} \left[ \frac{z(t_H-t_L) - zt_L + zt_L - t_L t_L + t_H t_H - zt_H}{t_H-t_L} \right] = \theta r + \frac{(1-\theta)}{2} \left[ \frac{(-t_L t_L + t_H t_H) / (t_H-t_L)}{t_H-t_L} \right] = \theta r + \frac{(1-\theta)}{2} \left( t_H + t_L \right) = \left\{ \frac{t_H+t_L}{2} + \theta \left[ r - \frac{t_H+t_L}{2} \right] \right\} = \_ + \theta (r - \_)
\]

To determine the expected sale price with a RFO, we first have to derive the optimal \( p' \). To maximize the value of a RFO, \( p' \) must have the following properties:

(i) \( p' \leq t_H \), the maximum amount necessary to prevent \( O \) from selling \( Y \) to \( T \);
(ii) \( p' \geq t_L \), the minimum value \( T \) may place on \( Y \);
(iii) \( p' \geq o+\theta(r-o) \), the price \( R \) would pay if \( O \) could not sell \( Y \) to \( T \).

Lemma 6: For \( t_H \geq p' \geq t_L \) and \( p' \geq o+\theta(r-o) \), \( p' = (t_L + \theta r) / (1+\theta) \) maximizes the value of a RFO.
Proof: Within the constraints, O will accept R's offer if \( p'_t \times \); if \( p' < t \), O will reject the offer and the conditional expected sale price is \((t_H+p')/2 + \theta [r - (t_H+p')/2] \). The expected sale price given \( p' \) is therefore:

\[
\frac{(p'-t_L)/(t_H-t_L)}{g180} \times p' + \left[ \frac{(t_H-p')/(t_H-t_L)}{g180} \times \{ (t_H+p')/2 + \theta [r - (t_H+p')/2] \} \right] = \left[ \frac{1/(t_H-t_L)}{g180} \times \{ (p'-t_L) \times p' + (t_H-p') \} \right] \times \left[ \frac{(t_H+p')}{2 + \theta [r - (t_H+p')/2]} \right] \}
\]

Differentiating yields: \[1/(t_H-t_L) \times [ 2p' - t_L - \theta r - (1-\theta)p' ] \] which equals 0 at \( p' = (t_L+\theta r)/(1+\theta) \). As the second derivative is positive, the expected sale price has a minimum at \( p' = (t_L+\theta r)/(1+\theta) \).

We now turn to deriving the value of a RFO.

(I) For \((t_L + \theta r)/(1+\theta) > t_H > o + \theta (r-o)\)

Optimal \( p' = t_H \). O will accept R's offer regardless of the value of \( t* \) and sell \( Y \) to R for \( t_H \). The value of a RFO is thus: \( _+ \theta (r - _) - t_H = \theta (r - _) - (t_H - _) \)

(II) For \( t_H > (t_L + \theta r)/(1+\theta) > o + \theta (r-o) \)

Optimal \( p' = (t_L + \theta r)/(1+\theta) \). O will accept R's offer if \( p' > t* \); if \( p' < t* \), O will reject the offer and the conditional expected sale price is \((t_H+p')/2 + \theta [r - (t_H+p')/2] \). The expected sale price is thus:

\[
\frac{(p'-t_L)/(t_H-t_L)}{g180} \times p' + \left[ \frac{(t_H-p')/(t_H-t_L)}{g180} \times \{ (p'+t_H)/2 + \theta [r - (p'+t_H)/2] \} \right]
\]

From Lemma 5 (substituting \( p' \) for \( z \)), it follows that the value of the RFO is:

\[
\frac{(p'-t_L)/(t_H-t_L)}{g180} \times \{ (p+t_L)/2 + \theta [r - (p'+t_L)/2] - p' \}
\]

(III) For \( t_H > o + \theta (r-o) > (t_L + \theta r)/(1+\theta) \)

Optimal \( p' = o + \theta (r-o) \). O will accept R's offer if \( p' > t* \); if \( p' < t* \), O will reject the offer and the conditional expected sale price is \((t_H+p')/2 + \theta [r - (t_H+p')/2] \). The expected sale price is thus:

\[
\frac{(p'-t_L)/(t_H-t_L)}{g180} \times p' + \left[ \frac{(t_H-p')/(t_H-t_L)}{g180} \times \{ (p'+t_H)/2 + \theta [r - (p'+t_H)/2] \} \right]
\]

From Lemma 5 (substituting \( p' \) for \( z \)), it follows that the value of the RFO is:
\[
\left[ \frac{(p'-t_L)}{(t_H-t_L)} \right] \times \left\{ \frac{(p'+t_L)}{2} + \theta \left[ r - \frac{(p'+t_L)}{2} \right] - p' \right\}
\]

\textit{(IV) For } o+\theta(r-o)_t \textit{ } _{t_H} \\

Optimal \( p' = t_H \) (or, for that matter, any \( p' \) with \( o+\theta(r-o)_p'_{t_H} \)). \( O \) will reject \( R \)'s offer regardless of the value of \( t^* \) and sell \( Y \) to \( R \) at an expected sale price of \( o+\theta(r-o) \). The value of a RFO is thus: \( (1-\theta) (\_ - o) \). \( \blacksquare \)

**Proposition 7:** If \( c > 0 \) is uncompensable, \( t^* > o \), and \( T \) does not know \( r \), but knows its distribution, the value of a RFR is as given in Table 3.

**Proof for Proposition 7:** To prove Proposition 7, we first prove the following Lemma:

**Lemma 7:** \( T \) derives 0 expected gain from making an offer of \( p^o = \pi \)

**Proof:** \( T \) incurs costs \( c \) in making an offer. If \( R \) does not exercise the RFR, \( T \) will derive gross gains of \( t-p^o \), yielding expected gains of \( (t-p^o) \cdot \Pr(p^o>r) - c \). Setting \( (t-\pi) \cdot \Pr(\pi>r) - c = 0 \) yields
\[
\pi = t - c/\Pr(\pi>r).
\]

Competition among third parties will cause \( T \) to be willing to agree to purchase \( Y \) for \( \pi \) (whenever \( \pi \) exists). If the equation \( \pi = t - c/\Pr(\pi>r) \) has no solution, there is no \( p^o \) that \( T \) would offer (Line I). If \( o+\theta(r-o)>\pi \), \( T \) would be willing to agree to purchase \( Y \) for \( \pi \), but \( O \) would not enter into such an agreement triggering the RFR (Line II). In either case, \( Y \) becomes de facto unmarketable to \( T \). For \( r>t^* \), Lemmas 1 and 3 show that the value of the RFR is \( (1-\theta)(t^*-o) \). For \( t^*>r \), \( R \) would not have purchased \( Y \) without the RFR and its value is accordingly \( (1-\theta)(r-o) \).

If \( \pi > o+\theta(r-o) \), \( O \)'s optimal strategy is to agree to sell \( Y \) to \( T \) for \( \pi \), triggering the RFR. If \( \pi > r \), \( R \) will not exercise the RFR, which accordingly has no value (Line III). If \( r>\pi \), \( R \) will exercise the RFR and acquire \( Y \) for \( \pi \). Without the RFR, \( R \) would have bought \( Y \) for \( t^*+\theta(r-t^*) \) if \( r>t^* \) (Lemma 1)
and would not have bought Y if \( t^* > r \). For \( r > t^* \), the value of the RFR thus is \( t^* + (r - t^*) - \pi \) (Line IV); for \( t^* > r \), the value of the RFR is \( r - \pi \) (Line V). \[ \blacksquare \]
Table 2: Right of First Offer with Imperfect Information

<table>
<thead>
<tr>
<th>Condition</th>
<th>Optimal p'</th>
<th>Value of First Offer Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>I ((t_L + \theta r)/(1+\theta) &gt; t_H &gt; o+\theta(r-o))</td>
<td>(t_H)</td>
<td>(\theta(r - _) - (t_H - _))</td>
</tr>
<tr>
<td>II (t_H &gt; (t_L + \theta r)/(1+\theta) &gt; o+\theta(r-o))</td>
<td>((t_L + \theta r)/(1+\theta))</td>
<td>((p' - t_L)/(t_H - t_L) \times { (p' + t_L)/2 + \theta[r-(p' + t_L)/2] - p' })</td>
</tr>
<tr>
<td>III (t_H &gt; o+\theta(r-o) &gt; (t_L + \theta r)/(1+\theta))</td>
<td>(o+\theta(r-o))</td>
<td>((p' - t_L)/(t_H - t_L) \times { (p' + t_L)/2 + \theta[r-(p' + t_L)/2] - p' })</td>
</tr>
<tr>
<td>IV (o+\theta(r-o) &lt; t_H)</td>
<td>(t_H)</td>
<td>((1-\theta) (_ - o))</td>
</tr>
</tbody>
</table>