Correlated Information, Mechanism Design and Informational Rents

Sérgio O. Parreiras*
University of North Carolina, Department of Economics
Gardner Hall CB 3305, Chapel Hill, N.C. 27599

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Abstract

Can the auctioneer – without observing the buyers’ investment in information gathering – construct a selling mechanism that extracts all of the buyers’ surplus? I show that the full surplus extraction is not possible when the auctioneer does not know how noisy is the signal of a buyer, or equivalently, when the signals available to a buyer can be ranked in order of informativeness by Blackwell’s criterion. Thus, a buyer’s type describes the probability distribution from where the buyer’s signal is drawn, and the particular extraction of that signal as well. In the optimal mechanism, provided that it is not optimal for the auctioneer to exclude any type, informational rents are left to well informed types.

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1 Introduction

I study the full surplus extraction when the auctioneer does not observe the effort that buyers spend in information gathering. Thus, a buyer’s type describes both the probability distribution from where the buyer’s signal is drawn, and the particular extraction of that signal as well.

To illustrate, consider an investment bank preparing an initial public offering (IPO). The typical potential subscribers have correlated information regarding the future profitability of the venture. Therefore, accordingly to the theory, Cremer & McLean (1988) and McAfee & Reny (1992), the bank should be able to design a selling mechanism that yields the expected present-value of the venture, given all the information available to the potential subscribers. Yet, there is extensive empirical evidence that IPOs are often underpriced (Smith 1986).

Also, consider a regulatory problem. Although by resorting to subsidies, the regulator can induce firms to produce the efficient quantity, social loss occur whenever transfers to the firms are financed by distortionary taxes. Nevertheless, as long as the costs of firms are correlated, the regulator can recoup the subsidies. Thorough benchmarking, that is – by requiring firms to buy licenses with payments contingent on the performance of competitors, the regulator avoids the shadow cost of public funds. Consequently, the social efficient outcome is implementable.

Accounts of why the seller fails to extract all the surplus rely on risk aversion and limited liability (Robert, 1991) or competition among sellers (Peters, 2001). Another explanation pursued here is that the optimal mechanism requires too much knowledge from the principal. It is rather unrealistic that the amount of effort that each potential buyer devotes to gather information is common-knowledge.

Consider a simple common-value example in which the object may have
either a low or a high value. There are two available information technologies, either a buyer knows precisely the object value or the buyer is uninformed. If initially all buyers are uninformed, the auctioneer can easily extract all the surplus by making a take-or-leave offer to sell the object for its expected value. In this instance, provided that the cost of acquiring information is not too high, the best response of buyers is to acquire information. Therefore, when the value is low, buyers do not participate. When the value is high, buyers enjoy positive surplus since the object is sold for its expected value. But, if all buyers acquire information, the seller best response is to conduct a second-price auction, which again extracts all the surplus. Moreover, since the cost of acquiring information is sunk when the auction takes place, buyers who acquire information incur losses and so the buyers’ best response is to not acquire information. Therefore, in equilibrium, it must be that buyers acquire information with positive probability but not with certainty.

When it is possible that a buyer is either be informed or uninformed, the optimal strategy for the seller is to offer menus of contracts to each buyer. By selecting a contract, a buyer gains the right to participate into a second-price auction. A contract, however, obligates the buyer to payments, which can depend on the contractual choices made by other buyers.

A well informed type of the buyer can mimic the contractual choice of a poorly informed type without incurring higher expected payments than the poorly informed type incurs. More precisely, a well informed type can add ‘noise’ to his or her information when choosing a contract simply by randomizing over contracts the poorly informed chooses. As a result, the seller is unable to charge the well informed a higher entry fee than the fee paid on average by the poorly informed. Nevertheless, due to his or her informational advantage, the well informed buyer is able to obtain a higher expected surplus in the subsequent auction. Therefore, the well informed can always guarantee to her/himself a surplus higher than the poorly informed
gets. In sum, the optimal mechanism must leave informational rents to the well informed buyer.

The property that signals available to a buyer can be ranked in order of informativeness by Blackwell’s criterion is non-generic. Although, it might be convenient to consider the primitives of the model (preferences and information structure) as exogenously given, it is false that the primitives are randomly picked. Preferences and the information structure are shaped by history and clearly, endogenously determined preferences and/or information structures may fail to be generic:

In the above regulatory example, the value of a license to a firm may depend on past investment decisions of the firm that are unknown to the regulator and uncorrelated with the costs of the competitors. That formulation yields non-generic primitives exactly as in Neeman (1999).

In the above common-value example, acquisition of information and the mechanism choice generate a non-generic information structure. Similarly, non-generic information structures arising endogenously in Bergemann & Välimäki (2000) and also in Bergemann & Pesendorfer (2001).

2 Related Literature

The full surplus extraction result is clearly counterfactual and at odds with the economic intuition. Cremer & McLean (1988, p. 1254) pointed the result rests on the very strong assumption that the probability distribution of the buyers’ types is commonly-known. Several recent papers have moved towards relaxing the common-knowledge assumption:

Bergemann and Morris (2001) study large type spaces where a type is a description of a player’s payoff-relevant characteristics and his or her belief regarding the other players’ types. The type spaces are large in the sense that there may be many types of a player with the same payoff relevant
characteristics but with distinct beliefs. So, intuitively, a large type space reflects a lack of common-knowledge of the environment.

Neeman (1999) is very closely related work that also considers large type spaces. More precisely, full surplus extraction is ruled out when a player has at least two types who hold identical beliefs but have different payoff-relevant characteristics. In an optimal auction, the seller is able to elicit the players beliefs but if there is a low valuation and a high valuation type that hold the same belief, the seller must leave a positive surplus to the high valuation type. Clearly, the rent accrued by the high valuation type is not an informational rent.

Amarante (2001) is another work to consider large type spaces. Each buyer has types with the same valuation but with distinct beliefs. In addition, as in C&M-P&R, the seller offers to each buyer a menu of stochastic entry fees to a Vickrey auction. But, the seller is restricted to ‘simple’ mechanisms. More exactly, the payment stipulated by an entry fee can be conditional only on the bids submitted by the other players. But, in the private value model, a player bids his or her valuation. Obviously, since many types of a player bid the same, the seller lacks instruments to extract the surplus.

McLean & Postlewaite (2000) study efficient auctions but there types are not split into payoff-relevant and belief components. Instead, types are split into common and private value components.

Another criticism to the result of Cremer & McLean is that the optimal mechanism appears awfully complex. Many papers have analyzed simple and robust mechanisms, few examples are: McAfee et al. (1989), Brusco (1998), Lopomo (1998, 2001), Amarante (2001) and Bergemann & Morris (2001).
3 Rent Extraction in a Nutshell

This section introduces the most of the notation used in the rest of the paper and revisits the results of Cremer & McLean (1988) and McAfee & Reny (1992), C&M-P&R henceforth.

Consider a finite Bayesian game \( \Gamma = (N, (C_i)_{i \in N}, (T_i)_{i \in N}, (p_i)_{i \in N}, (u_i)_{i \in N}) \) where, as usually, \( N \) is the set of players, and for each player \( i \in N \): \( C_i \) is the set of possible actions, \( T_i \) is the set of types, \( p_i \) is the belief over the types of other players (conditional on \( i \)'s own type), and \( u_i \) is the payoff function.

Let \( \sigma \) be a Bayes-Nash equilibrium of \( \Gamma \). For every player \( i \), consider the set of actions that \( i \) plays at \( \sigma \): \( C_\sigma^i = \{ c \in C_i : \sigma_i(c) > 0 \} \). Let \( q_i \) be the conditional probability distribution over \( C_\sigma^i \) that is induced by \( i \)'s beliefs and the equilibrium profile:

\[
q_i(c_{-i}|t_i) = \sum_{c_{-i} \in C_{-i}^i} \left( \prod_{j \in N_{-i}} \sigma_j(c_j|t_j) \right) p_i(t_{-i}|t_i),
\]

and let \( Q_i \) be the \(#C_\sigma^i\)-by-\(#T_i\) matrix whose entries are given by \( q(c_{-i}|t_i) \). And finally, let \( u_\sigma^i = (u_i(\sigma|t_i))_{t_i \in T_i} \) be the vector of equilibrium payoffs of player \( i \)'s types.

The rent extraction problem is to find a finite collection of stochastic entry fees, \( x_i^k : C_{-i}^\sigma \to \mathbb{R} \) for \( k \in T_i \), in order to maximize

\[
\sum_{t_i \in T_i} \left( \min_k \sum_{c_{-i} \in C_{-i}^\sigma} x_i^k(c_{-i}) q_i(c_{-i}|t_i) \right) p(t_i)
\]

subject to the participation constraints,

\[
\forall t_i \in T_i, \quad \min_k \sum_{c_{-i} \in C_{-i}^\sigma} x_i^k(c_{-i}) q_i(c_{-i}|t_i) \leq u_\sigma^i(t_i).
\]

The basic idea is the same as in C&M–P&R: the principal offers a menu of stochastic entry fees to player \( i \). By picking an entry fee from the menu,
player $i$ is allowed to play the game $\Gamma$. The expected payments stipulated by an entry fee do not depend upon the action $i$ chooses to play later on in the game. Hence, $i$ must select the entry fee with the lowest expected payment conditional on his/her type, of course, provided that the required payments do not exceed the equilibrium payoffs.

In this paper, contrary to the formulation of C&M–P&R the principal is only allowed to contract on the actions that might be played at the game. In a revelation mechanism, the principal can contract on the types reported by the other players. As long as there is not ‘too much’ pooling at the equilibrium, both formulations are equivalent. Moreover, all results of this paper also hold true under the formulation of C&M–P&R.

The main result of C&M–P&R is a necessary and sufficient condition for an information structure $((T_i)_{i \in N}, (p_i)_{i \in N})$ such that, for any given payoff function of player $i$, the principal is able to extract all the surplus of $i$.

**Theorem 1 Cremer & McLean (1988)** The optimal mechanism yields full surplus extraction for any $u_i^\sigma$ if and only if $\forall t_i \in T_i$, $\exists (\lambda_\tau)_{\tau \in T_i \setminus \{t_i\}} \geq 0$ such that

$$p_i(t_{-i}|t_i) = \sum_{\tau \in T_i \setminus \{t_i\}} \lambda_\tau p_i(t_{-i}|t_i), \quad \forall t_{-i} \in T_{-i}. \quad (C1)$$

A sufficient condition for full extraction, slightly stronger than C1, is that the rank of $Q_i$ be equal to $\#T_i$. Proof: without any loss of generality, assume that $Q_i = (Q_{i1} \quad Q_{i2})$ where $Q_{i1}$ is a $\#T_i$–by–$\#T_i$ matrix with full rank. It is easy to see that the entry fee, $x_i^\top = (Q_{i1}^{-1}u_i^\sigma \quad 0)$, extracts the surplus.

It is worth point that, in this case, the principal is able to extract all rents of a player by simply offering a single stochastic entry fee instead of resorting to a menu of entry fees. In C&M–P&R, the main role of the menu of entry fees is not to so much as to provide additional instruments for the
principal but rather, to reveal the types of players throughout their selection of entry fee.

When the correlation among types vanishes away, the transfers prescribed by the optimal entry fee become arbitrarily large. Consequently, when types are almost independent and players are risk-averse or have limited liability, the principal can not achieve full extraction (Roberts, 1991). Since, players will be averse and/or unable to hold fees that may impose arbitrarily large payments. Proof: consider a convergent sequence of information structures: $Q^n_i \to \overline{Q}_i$ as $n \to +\infty$, such that $Q^n_{i1}$ has full rank, reflecting correlation among types; and all rows of the limit matrix $\overline{Q}_i$ are identical – reflecting absence of correlation in the limit. Also, consider the corresponding sequence of payoffs, which is assumed to be continuous with respect the information structure, $u^{\sigma^n_i} \to \overline{u}_i^n$. If the entry fee remains bounded, $||x^n_i|| < M$, there is a convergent subsequence of entry fees $x^{n_k}_i \to \overline{x}_i$. Furthermore, $u^{\sigma^{n_k}_i}_i = Q^{n_k}_{i1} x^{n_k}_i \to \overline{Q}_{i1} \overline{x}_i$ and so the limit entry fee extracts the surplus, $\overline{u}_i^n = \overline{Q}_{i1} \overline{x}_i$ but in the limit types are independent and so full extraction is not possible in general, however, cf. Harstad & Mares (2002).

4 Signal Accuracy

In most applications (e.g. auctions), the signal of a player is identified to his or her type. To contemplate the possibility that a player may have a more or less informative signal, this identification is no longer useful. Henceforth, a player type shall describe both the probability distribution from where the player’s signal is drawn and the particular extraction of that signal as well. For example, type $t_i = (x; \theta)$ is the type of player $i$ who observes realization $x$ from signal $X^\theta$.

For simplicity, here I consider only the case where player $i$ has access to two possible information technologies – signal $X^\theta$ and signal $X^n$.
Signals are ranked in order of informativeness by Blackwell’s criterion: signal $X^\theta$ is more informative than signal $X^\eta$ if and only if there exist scalars $\beta_{(x,y)} \geq 0$ such that, for all $y$ realizations of $X^\eta$ and all $t_{-i} \in T_{-i}$,

$$ \frac{p(t_i = (y, \eta)|t_{-i})}{p(t_{i2} = \eta)} = \sum_{x \in \text{supp } X^\theta} \beta_{(x,y)} \frac{p(t_i = (x, \theta)|t_{-i})}{p(t_{i2} = \theta)}, \quad (C2) $$

where $p$ is the common-prior distribution and

$$ \sum_{y \in \text{supp } X^\eta} \beta_{(x,y)} = 1. $$

The definition above says that signal $X^\eta$ is a garbling of $X^\theta$. Intuitively, one should think of $X^\eta$ as a further randomization over the outcomes of $X^\theta$ where, as figure 1 shows, $\beta_{(x,y)}$ are the weights employed by this ‘randomization’. By means of these ‘weights’, I define an order relation on $T_i$:

Figure 1: $X^\eta$ is obtained by adding ‘noise’ to $X^\theta$

$$(x, \theta) \succ (y, \eta) \text{ if and only if } \beta_{(x,y)} > 0.$$  

Later on, this order relation will be used to classify information structures.

**Theorem 2** If player $i$ signal may be either $X^\eta$ or $X^\theta$ and signal $X^\theta$ is more informative than $X^\eta$ then full surplus extraction for any $u^*_i$ is not possible.
Proof. Let $\lambda_{(x,y)} = \beta_{(x,y)} \frac{p(t_i = (x, \theta))}{p(t_i = (y, \eta))}$ where $\beta_{(x,y)}$ are the coefficients implied by Blackwell’s ranking (C2). Bayes’ rule implies that,

$$\frac{p(t_{-i}|t_i = (y, \eta))}{p(t_{-i}|t_i = \eta)} = \frac{p(t_{-i})}{p(t_i = (y, \eta))} \frac{p(t_i = (y, \eta)|t_{-i})}{p(t_i = \eta)} =$$

$$= \frac{p(t_{-i})}{p(t_i = (y, \eta))} \sum_{x \in \text{supp } X^\theta} \beta_{(x,y)} \frac{p(t_i = (x, \theta)|t_{-i})}{p(t_i = \theta)} =$$

$$= \sum_{x \in \text{supp } X^\theta} \beta_{(x,y)} \frac{p(t_i = (x, \theta))}{p(t_i = (y, \eta))} \frac{p(t_{-i}|t_i = (x, \theta))}{p(t = \theta)} =$$

$$= \sum_{x \in \text{supp } X^\theta} \lambda_{(x,y)} \frac{p(t_{-i}|t_i = (x, \theta))}{p(t_i = \theta)} \blacksquare$$

Observe that the proof of Theorem 2 can be easily adapted for the case where signals have continuous distributions, as the common-value example given below shows.

Example 1 As in Kagel & Levin (2000), the signals belong to a family of uniform distributions parameterized by $\varepsilon$, more exactly

$$X^\varepsilon|V \sim U[V - \varepsilon, V + \varepsilon].$$

Notice that $f^\varepsilon(y|\nu) = \frac{1}{\varepsilon} f^\varepsilon(x_1|\nu) + \frac{1}{\varepsilon} f^\varepsilon(x_2|\nu)$ where $x_1 = y - \varepsilon$ and $x_2 = y + \varepsilon$. Hence, $X^\varepsilon$ is more informative than $X^{2\varepsilon}$.

5 Informational Rents

Theorem 2 presents a condition (C2) on the information structure such that the complete extraction of the surplus is not achievable for an arbitrary payoff function. Condition C2 has a clear interpretation, yet, for most applications,
Theorem 2 is not entirely satisfactory. Since, for a given game, the equilibrium payoffs are dependent on the information structure. Therefore, one is lead to investigate what restrictions C2 imposes on the equilibrium payoffs.

Condition C2 is a purely informational assumption and so, the payoff of player $i$ must satisfy:

$$u_i(c|t_i = (y, \eta)) = \sum_{x \in \text{supp } X^\theta} \lambda_{(x,y)} u_i(c|t_i = (x, \theta)), \quad \forall c \in C.$$  

The payoff of a poorly informed type is an average of the payoff of well informed types. Because, summing over $t_{-i}$ in C1 gives $\sum_x \lambda_{(x,y)} = 1$. Thus, an equilibrium payoff profile must satisfy: for all $y \in \text{supp } X^n$,

$$u_i^\sigma(y, \eta) \leq \sum_{x \in \text{supp } X^\theta} \lambda_{(x,y)} u_i^\sigma(x, \theta) = \lambda_y^\top u_i^\sigma(\theta) \quad (C3)$$

It is convenient to write the matrix of conditional probabilities as,

$$Q_i = \begin{pmatrix} Q_i^\theta \\ \lambda_{y_1}^\top Q_i^\theta \\ \vdots \\ \lambda_{y_m}^\top Q_i^\theta \end{pmatrix},$$

where: $Q_i^\theta$ is a $n$–by–$\#C^\sigma_{-i}$ matrix; $n + m = \#T_i$ and $n > m$. In another words, player $i$ has $n$ well informed types and $m$ poorly informed types. We assume that,

$$Q_i^\theta \text{ has rank } n, \quad (A1)$$

and consequently, full extraction would be possible if were not by the presence of poorly informed types.

Now, consider the sets $S = \{ v \in R^{\#T_i} : v = Q_i x \text{ and } x \in R^{\#C^\sigma_{-i}} \}$ and $\overline{S} = \{ u \in R^{\#T_i} : u = v^1 \land \cdots \land v^k \text{ with } v^j \in S \text{ for } j = 1, \cdots, k \}$ where $u \land v$ is the vector obtained as the pointwise minimum of the vectors $u$ and $v$. Whereas an element of $S$ represents the amount per type that the principal
is able to collect by offering a single entry fee to player \(i\), an element of \(\overline{S}\) represents the amount per type the principal collects by offering a menu of entry fees.

If all types of player \(i\) are to choose from one of the fees in the menu, it must be that the amount payed by a type is no greater than his or her equilibrium payoffs. Thus, the rent extraction problem can be formulated as,

\[
\max p^\top u \quad \text{subject to} \quad u \in \overline{S}, \quad u \leq u_i^q
\]  

where \(p = (p(t_i))_{t_i \in T_i}\). If \(u_i^q \in S\) then clearly full surplus extraction is achievable. To avoid this trivial case, we assume that exists a \(j\) such that

\[
u_i^q(y_j, \eta) < \lambda^\top_{y_j} u_i^\top(\theta). \tag{A2}
\]

This is a week assumption – in general, A2 should hold for all \(j\). It is easy to see that A2 implies that \(u_i^q \notin S\). Moreover, A2 also implies that full extraction is not achievable, \(u_i^q \notin \overline{S}\). Proof: if \(u_i^q \in \overline{S}\) then \(u_i^q = \bigwedge_{l=1}^k v^l\) but that implies the contradiction:

\[
\bigwedge_{l=1}^k v^l(y_j, \eta) > \lambda^\top_{y_j} \bigwedge_{l=1}^k v^l(\theta) = \lambda^\top_{y_j} u_i^\top(\theta) > u_i^q(y_j, \eta) = \bigwedge_{l=1}^k v^l(y_j, \eta).
\]

The proposition below presents a simple proof of the existence of informational rents. Evidently, it could also be directly obtained as a corollary of Blackwell’s Theorem.

**Proposition 3** Assume A2 and also that no type is excluded by the optimal mechanism, then player \(i\) obtains a higher expected surplus at the optimal mechanism when his/her signal is \(X^\theta\) than when it is \(X^\eta\).
Proof. Let \( \{v^i\} \) be an optimal entry fee schedule. Consider the following alternative strategy. Each well-informed type \((x, \theta)\), instead of choosing the fee \(v(x, \theta)\) designated to his/her own type, chooses with probability \(\beta_{(x,y)}\) a fee intended for a poorly informed type \((y, \eta)\) where \(\beta_{(x,y)}\) is the weight given by ???. This strategy guarantees that the expected entry fee payment of the well-informed 'type' \(\theta\) is equal to the payment that the poor-informed 'type' \(\eta\) incurs. In the following auction, however, A2 and C3 assures that the well-informed type obtains a strictly higher surplus. 

6 The Optimal Mechanism

The rent extraction problem \((\overline{P})\) is a linear programming problem. To characterize its solution, we first state an useful fact on the structure of \(S\):

\[
S \subseteq \overline{S} \subseteq \mathbb{S} = \left\{ u \in \mathbb{R}^{n+m} : u(\theta) = Q^\theta_i x \text{ and } u(y_j, \eta) \geq \lambda^\top_{y_j} Q^\theta_i x \text{ for all } y_j \right\}.
\]

To verify this fact, consider a generic element of \(\overline{S}\), \(u = \bigwedge_{k=1}^l v^k\) with \(v^k \in S\). There exists an \(x\) such that \(u(\theta) = Q^\theta_i x\) and so,

\[
u(y_j, \eta) = \bigwedge_{k=1}^l v^k(y_j, \eta) = \bigwedge_{k=1}^l \lambda_{y_j}^\top v^k(\theta) \geq \lambda_{y_j}^\top \bigwedge_{k=1}^l v^k(\theta) = \lambda_{y_j}^\top u(\theta) = \lambda_{y_j}^\top Q^\theta_i x.\]

Player \(i\) has a partitional information structure if \(\lambda_{y_j}^\top \lambda_{y_k} = 0\) for \(j \neq k\) or equivalently, if \((\theta, x) \succ (\eta, y_j)\) then \((\theta, x) \not\succ (\eta, y_k)\) for \(j \neq k\). Figure 1 depicts a non-partitional information structure, while figure 2 below shows a partitional information structure.

Also, player \(i\) has a proper information structure if for every \(y_j\) there is at least an \(x\) such that \((\theta, x) \succ (\eta, y_j)\) but \((\theta, x) \not\succ (\eta, y_k)\) for \(j \neq k\). Both figures 1 and 2 below exhibit a proper information structure.

Consider the new problem \((\overline{P})\) that is obtained by substituting the constraint \(u \in \mathbb{S}\) in \((\overline{P})\) for the constraint \(u \in \overline{S}\).
Proposition 4 If \( u^* \) solves \((\mathbb{P})\) then:

1. For all \( y_j \), \( u^*(y_j, \eta) = u^*(y_j, \eta) \);
2. For partitional information structures, \( u^* \in S \);
3. For proper information structures, \( u^* \) solves \((\mathbb{P})\).

Proof. The first statement of the proposition is evident and so its proof is omitted. The third statement follows directly from the fact that, for a proper information structure, \( S = \overline{S} \). Finally, to prove the second statement, observe that for any \( y_j \in \text{supp } X^\eta \) and any feasible \( u \) we have

\[
\lambda_{y_j}^\top u^*(\theta) \geq u^*(y_j, \eta) \geq u(y_j, \eta) \geq \lambda_{y_j}^\top u(\theta)
\]

Therefore, if \( u^*(y_j, \eta) > \lambda_{y_j}^\top u(\theta) \) then it would be possible to find \( u(x_k, \theta) > u^*(x_k, \theta) \) such that \((u(x_k, \theta), u^*(t_i))_{t_i \neq (x_k, \theta)}\). But, in that case, \( u^* \) would not be optimal and therefore the equality \( u^*(y_j, \eta) = \lambda_{y_j}^\top u(\theta) \) must hold.

7 Conclusion

This paper presented a simple model for mechanism design under correlated information that restored on firm grounds the economic intuition that better informed agents are able to obtain informational rents.

The findings obtained here also suggest a re-interpretation of the standard model of mechanism design with independent types. First, observe that for a
signal $X^\theta$ of player $i$ be more informative about the types of the other players than another signal $X^\eta$ of player $i$, it must be the case that the event that $i$ has the more or the less accurate signal is independent of the event that any other player has a more or a less accurate signal. Otherwise, the mere fact that player $i$ got signal $X^\eta$ would provide some information to $i$ about the quality of other players’ signals that $i$ would not be capable to infer if $i$ instead had got the signal $X^\theta$.

In sum, Blackwell’s ranking implies that the quality of the signal of a buyer is independent of the quality of the other buyers’ signals. Notice that, as a matter of fact, in any standard model of acquisition of information, the quality of signals is independent. Nash equilibrium requires players to choose their actions independently.

Therefore, instead of considering that the independent model reflects a knife-edge situation, one may interpret it simply as describing a continuation game, a reduced form of a larger game where players can invest in acquisition of information or make specific investment that enhance their payoffs.

References


