$$(5 - 1.5(q_1 + q_2))q_2 - q_2 = 1.33667.$$

Hence, a value production plan is $q_1 = .665$ and $q_2 = .668333$. To conclude, as in the above example, the firm with the superior information gets rewarded in the value production plan, by being assigned a higher level of production and thus higher profits.

10   Concluding remarks

Remark 1: Alternatively, one could have used the notion of the α-core which is defined as follows: We say that $q \in L_Q$ is an α-core of the game $\mathcal{C}$ if

it is not true that there exist $S \subset I$ and $(y_i)_{i \in S} \in \Pi_{i \in S} L_{Q_i}$ such that for any $z^{I \setminus S} \in \Pi_{i \notin S} L_{Q_i}, \Pi_i(y^S, z^{I \setminus S}) > \Pi_i(q)$ for all $i \in S$.

It follows that under our assumptions in Section 3 the α-core is nonempty [see Yannelis (1991)]. A collusive agreement that is an element of the α-core is individually rational, Pareto optimal and coalitional stable. Although these are clearly desirable properties, we do not have a straightforward way of selecting an element from the core that would capture the "worth" of each firm. To this end, the Shapley value provides a relatively easy way of figuring out the contribution of each firm to the total profits and how to distribute them among the firms.

Remark 2: In the two firms case, the Shapley value is in the core and therefore in this case the duopoly with differential information can be viewed as stable. This is not the case for more than two firms unless the corresponding TU game is convex. Zhao (1998) provides necessary and sufficient conditions for the deterministic TU game to be convex. In a subsequent paper we intend to examine the conditions which guarantee the convexity of the side-payments game defined in (8.1) or (8.2).

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