Full Disclosure in Organizations - Extended Abstract

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1 The Model

We consider an organization made up of a finite set of members, each receiving a private signal s_i from a finite set S_i. After being informed about his own type each agent i chooses an action $a_i \in \mathbb{R}$. When the type profile is $s = (s_1, ..., s_n) \in S$, agent i's payoff function is given by

$$u_i(a_1, ..., a_n; s) = -\alpha_{ii}(a_i - \theta_i(s))^2 - \sum_{j \neq i} \alpha_{ij}(a_i - a_j)^2, \tag{1}$$

where for every $i, j \in N$, $\alpha_{ij} \in (0, 1)$ and $\sum_{j \in N} \alpha_{ij} = 1$.

The first component of agent i's payoff is a quadratic loss in the distance between his action a_i and his ideal action $\theta_i(s) \in \mathbb{R}$. The second component is a miscoordination quadratic loss which increases in the distance between i's action and other agents' actions. The constant $\alpha_{ij} \in (0, 1)$ weights agent i's coordination motives with respect to j's action. The differences of the $\theta_i(s)$ across agents reflect agents' *conflict of interests* with respect to their ideal actions. We assume that players' types can be ordered such that for every $i, j \in N$ and $s_{-j} \in S_{-j}$, $\theta_i(s_j, s_{-j})$ is weakly increasing in s_j (assumption A).

Before this coordination game is played, but after each player has learnt his type, a simultaneous disclosure stage is introduced in which players can publicly and costlessly provide hard evidence about their types to the others. More precisely, every player i sends a message $m_i \in M_i(s_i)$ to every other player, $M_i(s_i)$ denoting the (nonempty) set of messages available to player i when his type is s_i. For simplicity we assume that players always have the option to fully certify their type, meaning that for every player i and type s_i of player i there is a message $m_{s_i} \in M_i(s_i)$ such that $m_{s_i} \notin M_i(t_i)$ for every $t_i \in S_i \backslash \{s_i\}$.

If all $\theta_i(s)$ were equal for every s, there would be no informational incentive problem and full information disclosure would therefore be trivial. Informational incentive conflicts arise because agents have different ideal actions and different incentives to coordinate with each others. In this context, our objective is to study the existence of a sequential equilibrium of this disclosure game in which, along the equilibrium path, every player always learns the type profile before choosing his action. Such equilibria are constructed with disclosure strategies such that every player always fully certify his type. For every player i and message profile $m = (m_1, \ldots, m_n)$ we construct beliefs off the equilibrium path for player i that put probability one on a single feasible type of player $j \neq i$, denoted by

$$wct_i^j(m_j) \in M_j^{-1}(m_j).$$

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Assuming further that this degenerate belief off the equilibrium path is common to all players other than j, it is easy to check that belief consistency in the sense of Kreps and Wilson (1982) is satisfied. Sequential rationality in the disclosure and action stages is defined as usual.

2 Related Literature

The class of preferences and information structures we consider include as particular cases several economically relevant models that have been considered in the existing literature about *communication in organizations*: Morris and Shin (2002, 2007), Angeletos and Pavan (2007), Calvó-Armengol and Martí (2007, 2009), Alonso, Dessein, and Matouschek (2008), Calvo-Armengol, Marti, and Prat (2009), Hagenbach and Koessler (2009).

Our work is also related to existing papers studying *strategic information revelation* in incomplete information games. Grossman (1981), Milgrom (1981) consider seller-buyer relationships in which the seller is privately informed about the quality of the product. They show that if it is costless to provide hard evidence, then in every sequential equilibrium the seller completely reveals product information to the buyer.

Okuno-Fujiwara, Postlewaite, and Suzumura (1990) consider a class of n-person games with quadratic utility functions in which all players are privately informed, but they assume strategic substitutes and positive externalities in actions. Van Zandt and Vives (2007) prove the existence of a fully revealing equilibrium in a class of disclosure games games with strategic complementarities assuming as in Okuno-Fujiwara et al. (1990) that types are independently distributed and that each player's utility function is increasing in the actions of the other players.

The assumption of positive externalities in actions is not satisfied in our model. To the best of our knowledge, only Seidmann and Winter (1997), Giovannoni and Seidmann (2007) and Mathis (2008) study disclosure in games without necessarily making this assumption. But as in Grossman (1981) and Milgrom (1981) they consider sender-receiver games with a single informed player (the sender) and a single decisionmaker (the receiver). Our first proposition, assuming independent types, uses a generalization of their single crossing argument to prove that a "worse case type" always exists. The proof of our second proposition with common values is more constructive, and allows to show that informational incentive constraints are also valid ex post. Hence, a fully revealing equilibrium exist even when players' types are correlated, and is robust to the timing of information disclosure.

3 Independent Types

For two types s_i and t_i of player i we say that type s_i wants to imitate type t_i if player i of type s_i is strictly better off when all the other players play the equilibrium actions (under complete information) as if they all believe that player i's type is t_i instead of s_i (which is more complicate than the usual one used in mechanism design or sender-receiver games because our definition should also include the best response of player i to other players' beliefs).

Our first Proposition shows that, *if players' types are independently distributed, then a fully revealing equilibrium exists.* To prove it, we show that, for any player i and any set of types $S_i' \subseteq S_i$ of player i, there is a type in S_i' that no other type of player i in S_i' wants to imitate. Hence, for any message certifying that player i's type is in S_i', the type that no other type wants to imitate is a worse case type for player i in S_i'.

Next, we provide an example showing that if the ideal actions are not monotonic in types (failure of A), then a fully revealing equilibrium may not exist. A second example shows that a fully revealing equilibrium may also fail to exist when players' types are correlated.

4 Common Value

While most models in the literature on strategic communication assume that types are independently distributed (e.g., Okuno-Fujiwara et al., 1990, Van Zandt and Vives, 2007, Alonso et al., 2008), other standard information structures involve correlation of types, especially under common values, where it is usually assumed that players receive signals about a common parameter that are independently distributed conditionally on this parameter (types are therefore unconditionally correlated). We extend the previous existence result of to correlated types assuming that players' ideal actions have a common value uncertainty component, and can be written as

$$\theta_i(s_1, \ldots, s_n) = \theta(s_1, \ldots, s_n) + b_i, \qquad \text{for every } i \in N, \tag{2}$$

where b_i is a constant "bias" parameter and $\theta_i(s_j, s_{-j})$ is weakly increasing in s_j for every $s_{-j} \in S_{-j}$.

Our second main proposition states that, *with common value, a fully revealing and* ex post *equilibrium exists.* With common value, we further extend our result of existence of a fully revealing equilibrium to *sequential and private communication*, and to the case in which the players are only able to *partially certify* their types.

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