Communication in dynastic repeated games: ‘Whitewashes’ and ‘coverups’

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Received: September 30, 2002; revised version: August 5, 2003

Summary. We ask whether communication can directly substitute for memory in dynastic repeated games in which short lived individuals care about the utility of their offspring who replace them in an infinitely repeated game. Each individual is unable to observe what happens before his entry in the game. Past information is therefore conveyed from one cohort to the next by means of communication.

When communication is costless and messages are sent simultaneously, communication mechanisms or protocols exist that sustain the same set of equilibrium payoffs as in the standard repeated game. When communication is costless but sequential, the incentives to “whitewash” the unobservable past history of play become pervasive. These incentives to whitewash can only be countered if some player serves as a “neutral historian” who verifies the truthfulness of others’ reports while remaining indifferent in the process. By contrast, when communication is sequential and (lexicographically) costly, all protocols admit only equilibria that sustain stage Nash equilibrium payoffs.

We also analyze a centralized communication protocol in which history leaves a “footprint” that can only hidden by the current cohort by a unanimous “coverup.” We show that in this case the set of payoffs that are sustainable in equilibrium coincides with the weakly renegotiation proof payoffs of the standard repeated game.

Keywords and Phrases: Dynastic repeated games, Communication, Whitewashing, Coverups.

JEL Classification Numbers: C72, C73, D82.

* We wish to thank an Associate Editor and Dino Gerardi as well as seminar participants at Arizona State, Columbia, Duke, Georgetown, Indiana, Montreal, Princeton, Rochester, Vanderbilt, VPI, the 2001 NSF/NBER Decentralization Conference, the Summer 2001 North American Econometric Society Meetings, and the Midwest Theory Conference, 2000, for useful comments and suggestions. All errors are our own.
“History is a pack of lies about events that never happened told by people who weren’t there.” – George Santayana

1 Introduction

1.1 Motivation

In any longstanding strategic relationship, history matters. The ability of the “players” to construct effective deterrents against “bad” behavior typically relies on accurate monitoring and recall of the history of play.

One chief interpretation of a long-term relationship is that of a stage game being repeated between “dynastic players” rather than between infinitely lived individuals. An infinitely repeated game is interpreted as an ongoing society populated by short-lived individuals who care about the utility of their successors who replace them. Each successor then faces the same “types” of opponents as his predecessor.

Examples of repeated strategic interaction that would be modeled as dynastic repeated games abound. For example, in longstanding disputes between groups with competing claims (e.g., Catholics versus Protestants in Northern Ireland, Israelis versus Palestinians), the conflicts typically outlive any particular individual. Though the names of individuals involved change with time, the issues (payoffs) often remain the same. Other examples include electoral competition between political parties (e.g., Democrats versus Republicans) and strategic competition between firms. Firms, like political parties, are long-lived organizations populated by short-lived managers, each of whom are periodically replaced. Putting agency issues aside, incentives may be structured so that each current manager acts in the long run interest of the firm, despite his relatively short tenure.

Since it seems unappealing to assume that any living individual observes something that takes place before he is “born,” a natural problem arises with dynastic games. It is well known that if the players do not have the means to condition their current actions on the history of play, equilibrium behavior changes dramatically. In the extreme case in which players have no knowledge of the past, strategic behavior can only depend on payoff relevant information (i.e., players must use so-called Markov strategies). When this happens and when the environment is stationary, then only repetitions of the stage game Nash equilibria are possible, even in an infinitely repeated game.1

In a dynastic game, each new entrant cannot condition his behavior on history unless his “knowledge” of that history comes, directly or indirectly, from past participants. Often, that means that current players must rely on the historical accounts directly communicated by their predecessors.2 This paper examines the properties of dynastic repeated games when participants do not observe history prior to their entry into the game, and must therefore rely on accounts communicated by their predecessors.

1 Hence, Santayana’s other famous dictum: “Those who cannot remember the past are condemned to repeat it,” is quite literally true.

2 For a useful perspective on the ways in which history is transmitted and collective memories are formed, see Pennebaker, Paez, and Rime (1997).