Information acquisition in global games of regime change

Michal Szkup [a,*], Isabel Trevino [b]

[a] *Vancouver School of Economics, University of British Columbia, 1873 East Mall, FL 9, RM 997, Vancouver, V6T 1Z1, Canada*
[b] *Department of Economics, University of California San Diego, 9500 Gilman Drive #0508 La Jolla, CA 92093, USA*

Abstract

We study costly information acquisition in global games of regime change (that is, coordination games where payoffs are discontinuous in the unobserved state and in the agents' average action). We show that only symmetric equilibria exist and provide sufficient conditions for uniqueness. We then characterize the value of information in these games and link it to the underlying parameters of the model. We investigate equilibrium efficiency, complementarities in information choices, and the trade-offs between public and private information. We show that information acquisition can be inefficient and that strategic complementarities in actions do not always translate into strategic complementarities in information acquisition. Finally, we find that public and private information can be complements. These results contrast findings in linear-quadratic models, where payoffs depend continuously on both the unobserved state and the agents' average action.
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* Corresponding author.
  E-mail addresses: michal.szkup@ubc.ca (M. Szkup), itrevino@ucsd.edu (I. Trevino).

1. Introduction

Global games have been extensively applied to model economic phenomena featuring coordination problems, such as currency crises (Morris and Shin, 1998), bank runs (Goldstein and Pauzner, 2005), FDI decisions (Dasgupta, 2007), and political revolts (Edmond, 2013). In a global game the payoffs of agents depend on both the state of the economy and the actions of others. However, agents observe only noisy private and public signals about this state and, in order to choose an optimal action, they have to make inferences about its true value and about the beliefs that other agents hold. This perturbation of the information structure of the game gives rise to a very rich sequence of higher-order beliefs, which leads agents to coordinate on a unique equilibrium. This prediction of a unique equilibrium contrasts the complete information model, which features multiple equilibria. While the original models have been extended along many directions, the precision of private signals has typically been exogenously given and set to be identical across agents. In this paper we introduce costly information acquisition into the standard global games framework.

Endogenizing information in a global game is a relevant endeavor, not only from a theoretical point of view but also from an applied one. Following Dasgupta (2007), one can think of an emerging economy that wants to attract foreign direct investment where potential investors have to decide whether to invest or not invest. For the profits to be positive, there has to be enough investment so that the liberalization program succeeds (due to increasing returns to aggregate investment), so investors will want to coordinate on their decisions.[1] The returns of the project depend also on the state of the emerging economy, which can be uncertain at the time of the investment decision. In this context, potential investors can acquire more precise information about the state of the emerging economy by buying reports that will assess the profitability of this investment.

Introducing costly information acquisition into a global game gives rise to a set of natural questions with non-trivial implications. We focus on the following questions: Do investors acquire the socially efficient amount of private information (i.e., do they over-acquire or under-acquire information)? Are there strategic complementarities in information choices (i.e., do investors want to learn what others learn)? What is the trade-off between private and public information in this context? Does more precise public information always crowd out private information acquisition? Does it increase the probability of a successful investment? And finally, does it increase welfare?

In order to answer these questions, we first characterize an equilibrium in our model. We establish that only symmetric equilibria exist, and we find that under mild conditions on parameters we can guarantee uniqueness of equilibrium. We define the value of additional information in our setup and analyze how it is affected by prior beliefs, the behavior of other players, and the cost of investment. We find that the value of additional information is determined by the extent to which it helps an agent to avoid two types of mistakes in the coordination game: investing when investment is not profitable, and not investing when investment is profitable.

Using these insights, we address each of the questions raised above under the assumptions that ensure uniqueness. We find that the unique equilibrium of the game is generically inefficient and that, depending on the characteristics of the economy, investors either over-acquire or under-acquire information. In terms of strategic motives in information acquisition, we find conditions

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[1] See Hall et al. (1986), Hall (1987), and Caballero and Lyons (1992) for evidence of increasing returns to scale in investment. Cooper (1999) provides an excellent overview of the literature on complementarities in macroeconomics.