Using competition to stimulate regulatory compliance: A tournament-based dynamic targeting mechanism[☆]

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ABSTRACT

This article develops a tournament-based dynamic targeting mechanism for achieving regulatory enforcement leverage. In contrast to existing models which rely on a representative agent, we model a game among a regulated group of agents, possibly heterogeneous in their levels of a regulated activity, that compete through their compliance decisions to avoid being targeted for future audits. The empirical properties of the dynamic tournament are established using economics experiments. In particular, we test comparative statics, highlight the importance of inducing competition through comparisons with a (non-competitive) standards-based targeting mechanism, and demonstrate enforcement leverage through comparisons with simple random audits. The experiments suggest that the dynamic tournament induces incentives consistent with theory, and overall we find that (introducing) competition in the regulatory enforcement arena may have important advantages.

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1. Introduction

Limited resources are typically available to enforce the compliance of regulatory standards, and this mandates that the regulator uses all available information to target for audit likely offenders. One potentially important source of information is the observed differences in the behavior of agents. Within the environmental, health, and tax arenas, this heterogeneous behavior may be tied to the disclosure of toxic releases, workplace injuries, and tax liabilities. When such information from regulated "peers" is available to use for targeting audit efforts, this naturally creates competition amongst players not to stand out in some undesirable way and draw scrutiny. A second source of information is the agent's own compliance history.

The regulatory compliance literature has largely focused on this, developing models where agents are placed into two (or more) groups based on their history of compliance relative to a regulatory standard (e.g., Landsberger and Meilijson, 1982; Greenberg, 1984; Harrington, 1988; Harford, 1991; Raymond, 1999; Friesen, 2003; Stafford, 2008; Liu and Neilson, 2013). Agents with poor compliance history are placed in a targeted group that is associated with higher expected costs (e.g., higher audit probability), and agents found to be compliant are transitioned to the non-targeted group (or remain non-targeted if already so).

In this paper, we develop a dynamic tournament model that characterizes a setting where the regulator incorporates both peer-evaluation and compliance history to target enforcement effort.[1] Agents in the dynamic tournament, through compliance efforts, compete to avoid being targeted for (costly) future audits. This competition hinges on agents' relative compliance as revealed by audits. We assume that agents placed in the targeted and non-targeted groups engage in separate tournaments. That is, those in the targeted group compete to be transitioned to the non-targeted group, and agents in the non-targeted group compete to avoid being moved to the targeted group. Harrington's (1988) seminal work began as a way to explain how the exercise of discretion in regulatory enforcement could achieve high levels of regulatory compliance despite the appearance of few inspections and low fines for violations. Our model, and complementary economics experiment, extends that argument to suggest targeted enforcement that promotes competition may be an effective way to achieve enforcement leverage.

A key feature in our model is that agents can be heterogeneous in the level of the regulated activity (e.g. pollution), which demonstrates that dynamic targeting mechanisms can be applied to groups of dissimilar agents. Existing models instead examine a representative firm that is simply solving a dynamic optimization problem with complete information about the rules governing inspections. In our model, the number of audits conducted at a given time is fixed, which introduces inspection capacity constraints. This is a departure from existing models that fix audit rates but do not limit the sizes of the targeted and non-targeted groups.

Similar to Harford (1991), we consider a continuous choice setting and uncertainty in the audit process. These features are endemic to field settings. Following Harrington (1988), most dynamic targeting models and all related experimental studies focus on a binary choice setting wherein firms choose to comply with a regulation or not, and audits perfectly reveal violations. In such settings targeting is only relevant to a firm if it complies when targeted but does not when not targeted; otherwise, if a firm always complies then there is no value to being in the non-targeted group. Consequently, as Friesen (2003) points out, optimal behavior by the regulator is to never inspect firms in the non-targeted group and to place firms in the targeted group at random.

In addition to these theoretical issues, experimental evidence suggests the leverage achieved by previous dynamic targeting models may be less than predicted. Cason and Gangadharan (2006) test Harrington's (1988) model and find that increasing the probability of being transitioned to the non-targeted group (when found compliant) increases the proportion of agents in compliance. However, the effect is not as large as theory suggests. Clark et al. (2004) test Harrington's (1988) and Friesen's (2003) dynamic targeting models and find that compliance rates are no higher than with simple random audits.

Though competitive incentives may (be perceived to) exist in common regulatory settings, the opaqueness of most enforcement processes make it difficult to identify the effects of competition using naturally-occurring data. As such, congruent with previous empirical studies in this area, we turn to the experimental laboratory to gain insight on the performance of the dynamic tournament mechanism. There are several existing experimental studies based on dynamic tournament models, but none are tied to regulation. The closest to our investigation are multi-stage elimination contests, where workers' effort choices in one stage affect payoffs in subsequent stages (e.g. Parco et al., 2005; Amaldoss and Rapoport, 2009; Sheremeta, 2010; Altmann et al., 2012). In contrast to these tournaments, rather than the contest prize being a fixed amount, the level of "effort" (i.e. disclosure) in our setting determines not only who "wins" (i.e. who is in the non-targeted group) but payoffs upon winning as effort determines the expected penalties for misreporting. Instead of eliminating losers from further competition, both winners and losers continue to compete with the possibility of transitioning back and forth between winner and loser groups. Finally, as the costly effort choice is intertwined with a compliance benchmark, attitudes toward cheating may lead to unique behaviors.

The experiment results confirm the comparative statics of the proposed dynamic tournament, and establish that the mechanism achieves significant leverage over random audits. These basic findings are consistent with Gilpatric et al. (2011), who provide favorable theoretical and experimental evidence on the ability of relative evaluation mechanisms such as tournaments to motivate regulatory compliance, but in a static setting. The standards-based dynamic targeting mechanism also achieves significant leverage. However, the theoretical incentives of this mechanism appear to translate poorly to behavior, as the predicted effects of changing the transition probability (through a change in the group-specific standards) or audit costs are not observed in the data. Thus, our findings overall stress caution in the use of the standards-based dynamic targeting mechanisms as policy instruments, and highlight the importance of (inducing) competition in regulatory settings.

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[1] To our knowledge, with the exception of concurrent work by Liu and Neilson (2013), both of these features have not been simultaneously modeled. In contrast to their work, we assume agents in different groups compete in separate tournaments, rather than in a single tournament. This simplifies the model dramatically (importantly, there is an analytical solution), and significantly increases the compliance effort induced by competition. Just as crucial, given that a key characteristic of targeting models is that different groups face different compliance incentives (e.g. audit probabilities), a single-tournament becomes a competition that only those in a particular group are likely to win. This characterization does not appear to fit the settings we endeavor to model.