Incentives for motivated experts in a partnership

Ting Liu[a], Ching-to Albert Ma[b], Henry Y. Mak[c,*]

[a] *Department of Economics and College of Business, Stony Brook University, 100 Nicolls Road, Stony Brook, NY 11794, USA*
[b] *Department of Economics, Boston University, 270 Bay State Road, Boston, MA 02215, USA*
[c] *Department of Economics, Indiana University–Purdue University Indianapolis, 425 University Boulevard, Indianapolis, IN 46202, USA*

ARTICLE INFO

ABSTRACT

A Principal has a set of projects, each having different benefit potentials, and each requiring a basic technology from one of two experts and time inputs from both experts. Experts enjoy motivation utilities from production, but have private information of their own motivation preferences and project potentials. Technology and time-input choices are experts' private decisions. Experts form a Partnership, which designs a sharing rule and a gatekeeping protocol to determine experts' priority on technology choice. Using a linear cost-share contract that lets experts make minimum profits, the Principal implements the first best by delegating all decisions to the Partnership.

1. Introduction

We study a Principal contracting with a group of experts for service or production. The Principal has a set of projects, each having a different potential for producing benefits. Each project requires one expert to be responsible for the basic production technology, and the time inputs of all experts. The project potential determines which expert should provide the basic technology as well as experts' time inputs. Experts observe projects' potentials, but the Principal does not. They also obtain some motivation benefits from service or production, but experts' motivation benefits are unknown to the Principal. Experts decide on who should provide the basic technology, and each expert decides on his own time input.

An example will illustrate our study. Suppose the Principal is a payer who contracts with a generalist physician and a specialist physician to care for a group of chronically ill patients. Patients' illness severities correspond to the production potentials, and these are observed by the physicians, but unknown to the payer. Physicians are altruistic, and enjoy utilities from patients receiving medical benefits. However, their altruistic utilities from patients' benefits vary and are private information. Physicians decide on the basic care setting for each patient. For example, if the illness severity is mild, the generalist takes the role as the primary provider, so care will be at his private office with consultation by the specialist at a hospi-

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tal; otherwise, the specialist takes the lead, and the setting will be reversed. The primary-provider decision corresponds to the basic technology choice. The specialist's technology is more advanced but also more costly than the generalist's. After the physicians have decided on the primary provider, they coordinate care by supplying medical services as a team. These services correspond to experts' time inputs.

Clearly, legal, accounting, and consulting professions have similar information and service structures. These are also common in construction, engineering, manufacturing, and even home building industries. In these professions and industries, the physicians' altruistic motivation in the medical field can be likened to professionalism, reputation, or both.

Our model posits two sources of missing information: project potentials and experts' motivation benefits. When the Principal must delegate production decisions to experts, distortions may result from missing information and experts' misaligned incentives of technology and time-input choices. In this paper we show that the Principal can implement the first best by delegating all decisions to an expert-partnership organization with a simple linear contract that partially reimburses the total production costs.

Why can the Principal solve all missing-information and misaligned-incentive problems with delegation and a linear cost contract? The heart of the solution lies in the way experts work together as members of a Partnership. Our concept of a Partnership consists of the following. First, a Partnership is a budget-neutral entity, receiving revenues from the Principal and sharing them among member experts. This is a standard assumption. Second, within the Partnership, experts are symmetrically informed about their motivational preferences and use this information to construct a sharing rule. Experts work closely together, so it is natural for them to know each other's preferences. Third, a Partnership keeps track of technology decisions and each expert's total time inputs, so the splitting of revenues can be made contingent on the collected information. This kind of internal accounting system is common in all firms. Finally, a Partnership can determine a gatekeeping protocol; this determines which among the experts has first priority to take on a project as the primary provider. Gatekeeping is common in the healthcare market, but any hierarchical processing of technology choice by professionals in other markets is similar.

Experts are economic agents, so we assume that each must earn a minimum profit to participate in the Partnership. The experts also enjoy private motivation benefits. In the case of physicians, their altruism is commonly recognized. In the case of professionals and other workers, the motivation benefits may actually come from future profits or their human-capital investment through their current work. In any case, our assumption is that these motivational benefits are private and cannot be capitalized. In other words, the Principal cannot extract any motivational benefits, but still must respect each expert's minimum-profit constraint.

Given the Principal's partial cost-reimbursement contract, for each project, the least motivated experts maximize their joint surplus by the first-best technology and time inputs, and also make the minimum profits. What about more motivated experts? Their higher motivation benefits drive them to maximize their joint surplus by over-utilizing technology and time inputs. However, this will violate experts' minimum-profit constraints. The Partnership then designs the sharing rule for the more motivated experts to deter over-utilization. The sharing rule then satisfies the binding minimum-profit constraint, and implements the first best again. Indeed, the sharing rule stipulates that as an expert becomes more motivated, he receives a smaller profit from adopting his technology and providing time input. The reduced financial benefit acts against the stronger motivation benefit, so more motivated experts are induced to choose the same first best as less motivated experts.

The first-best implementation is robust to many ways in which a Partnership is organized. In the basic model, a General Partnership chooses a profit sharing rule and a project gatekeeping protocol to maximize experts' joint surplus. In a Seniority Partnership, one expert contracts with the Principal, and chooses a sharing rule and a gatekeeping protocol to maximize his own payoff. The Principal can offer a single contract that implements the first best whether experts work together in a General Partnership or a Seniority Partnership.

Results here contrast sharply with the standard solution in the principal-multiagent mechanism design literature; see Mookherjee (2006) for a comprehensive survey. In the canonical model, a Principal designs a reward-punishment scheme which induces each agent to report truthfully his private information, then issues detailed instructions to each agent, and monitors the actions of each agent. We propose an alternative contracting paradigm. We show that the Principal can implement the first best by contracting with a partnership that retains private information and decision-making authority. Even more striking, the Principal achieves this implementation by a *single* contract.

Our model suggests that a Principal benefits from contracting with an expert organization. Partnerships can facilitate the match efficiency between projects and expertise. This is consistent with the empirical evidence in professional-service markets. Epstein et al. (2010) investigate obstetric practices and find that high-risk patients in group practices match with specialists more often than patients in solo practices. Furthermore, this improves patients' health outcomes.

Our analysis has policy bearings for the ongoing health care reform in the United States. As a bedrock of the reform, the Center for Medicare and Medicaid Services (CMS), the federal regulator managing Medicare and Medicaid has been encouraging health care providers to form Accountable Care Organizations (ACOs). In the ACO model, CMS contracts with a group of providers. An ACO is entrusted with coordinating patient care. This often requires sharing of information, consultation, and referrals between physicians within an ACO. Our model predicts that ACOs achieve a higher efficiency and a better care quality if they are paid by a mixture of capitation and cost-sharing contracts rather than by either pure capitation or pure