Productivity and the Complementary Nature of the Internal Institutions of the Firm

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Abstract
This essay is based upon the final chapter of my dissertation Mei (2007). After a brief description of the dissertation and its conceptual framework, the complementary relationship of internal structures of the firm is explained. The firm can be regarded as a relational production in which different individual productions are organized under formal and informal institutions such as hierarchies and teams. An institution corresponds with a certain relationship among the relational productivity and (or) individual productivity of agents. When processing different tasks becomes necessary for producing outputs, different institutions may be set up to coexist in a firm and complement each other to maximize its output.

Keywords: firm, formal institutions, informal institutions, productivity, complement.

1. Introduction
Since Coase’s seminal 1937 paper, the theory of the firm has focused on the nature of transactions under a multi-agent setting. Following Alchian and Demsetz (1972), Demsetz (1988, 1997), and Milgrom and Roberts (1990, 1995) where the nature of team production composed by different agents with complementarity is used to explain forms of organizations, in the dissertation titled Towards a Productivity Theory of the Firm, the productivity heterogeneity of different agents with complementarity, is put to the center of the analysis. Two issues are dealt with. The first is how productive heterogeneity affects the choice between the market (contract) and firm (ownership); the other is how productive heterogeneity affects the design of organizational structures within a firm such as hierarchies and teams. In this dissertation, it is shown that the firm and market complement rather than substitute for each other and that the productivity of agents determines the choice between the firm and market (chapters 2 and 3); further, it is shown that productivity heterogeneity also determines different types of hierarchies.

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within a firm (chapter 4). This essay (chapter 5) further explores the relationship between a hierarchy and team and argues that in order to process different tasks, which is necessary for generating outputs, different institutions such as ownership, hierarchies, and teams should be set up, and these institutions should complement one another to maximize the output of production.

In a firm, a hierarchy can be regarded as a formal institution of authority because once established, a hierarchy is relatively stable, exists for a relatively long period, and formalizes the relationship between agents. On the other hand, a team is an informal institution of communication, because most teams are temporarily built or even spontaneously formed and do not regulate the behaviour of most agents. Although both hierarchies and teams have been widely studied (Harris and Raviv, 2002; Hart and Moore, 2005; Maskin et al., 2000; Radner, 1993; Williamson, 1985; Zenger, 2002), little attention has been paid to the relationship between hierarchies and teams. In this essay, we follow Barnard who argues that informal organization enhances communication and maintains cohesiveness in formal organizations (Barnard, 1938) and attempt to explain the complementary relationship between informal and formal institutions in a firm.

The approaches in the present literature mainly include studies on information processing that emphasize how to optimize the information processing time (Marschak and Radner, 1972; Radner, 1993; Bolton and Dewatripont, 1994), incentives dealing with delegation between principles and agents (Aghion and Tirole, 1997; Baker et al., 1999; Rajan and Zingales, 2001), and decision-making based on idea screening (Sah and Stiglitz, 1986; Hart and Moore, 2005). In order to compare teams with hierarchies, we simplify the Hart-Moore model by considering only two agents in a decision-making process and focus on the authoritarian nature of a hierarchy and the communicative nature of teams. We compare the possible output of a hierarchy and that of a team in different decision-making environments and analyze the conditions in which a team/hierarchy may be set up. By building a relationship between agents’ productivity and the design of internal institutions, our analysis sheds light on some basic principles of organizational design and suggests an endogenous approach to the study of organizations based on the productive nature of economic agents.

The essay is organized as follows. In the Section 2, we discuss the productive nature of the firm. In Section 3, we analyze the different internal institutions of the firm. In Section 4, we analyze how different institutions complement one another. We draw some conclusions in Section 5.