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Job assignment, market power and managerial incentives

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ABSTRACT

I study how product market conditions determine labor market outcomes in an economy where a continuum of heterogeneous firms compete for heterogeneous managers. The main objective of the paper is to establish how market power and managerial talent influence the incentive contracts. If firms with higher (lower) market power benefit more from managerial actions, then managerial talent has greater effects in such firms, and hence more talented managers are lured into firms with higher (lower) market power following a positively (negatively) assortative matching pattern. The equilibrium relationship between market power and managerial incentives is monotone if and only if the equilibrium matching is monotone.

1. Introduction

Since Leibenstein's (1966) theory of *X-inefficiency*, a plethora of theoretical works, using agency models, have analyzed how product market competition affects managerial incentives within a firm (e.g. Hart, 1983; Hermalin, 1992; Raith, 2003; Scharfstein, 1988; Schmidt, 1997). Many empirical works support the view that increased product market competition, which may be measured by various fundamentals of the market, induces firms to elicit greater managerial effort by providing stronger incentives (e.g. Cuñat & Guadalupe, 2005; Karuna, 2007; Kole & Lehn, 1997; Nickell, 1996; Palia, 2000). On the other hand, Aggarwal and Samwick (1999) and Beiner, Schmid, and Wanzenried (2011) find a negative relationship between the degree of product market competition and managerial incentives. Although there is an apparent consensus of empirical studies regarding a monotone relationship between managerial incentives and product market competition, most of the theoretical predictions about such association have been ambiguous simply because competition affects the organizational structure of a firm via different channels which may not always point in the same direction.

The main objective of the present paper is two-fold. First, it aims at providing a unified framework that determines the level as well as the incentive structure of the executive compensation packages. I argue that this cannot be achieved using a standard agency model that involves only one firm and one manager. Second, the model intends to offer unambiguous predictions about the effects of market power or product market competition on managerial efforts and incentives. To this end, I analyze a matching market where heterogeneous managerial talent is assigned to firms which differ in market power. This approach allows to establish a one-to-one relationship between market power and managerial incentives. A manager's principal task is to undertake value enhancing non-verifiable actions such as effort, investment, etc. Due to non-verifiability, a moral hazard problem arises in the choice of actions. It is shown that the firms which benefit more from managerial actions lure more talented managers. A sorting or matching effect determines completely the equilibrium incentives, and hence managerial efforts and incentives are monotone with respect to market power whenever the equilibrium matching is monotone. I also analyze various sources of market power such as market size, price cap regulation, cost efficiency under which variation in market power has differential implications for incentives.

The literature on competition and managerial incentives in general takes the degree of product market competition as the determinant of managerial incentives. In the present model, each

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firm represents one distinct market, and hence greater intensity of competition is equivalent to lower market power. The phrase "more market power" or "less intense competition" may have many interpretations. First, in a strategic environment, number of firms, degree of product substitutability, cost of entry, etc. per se are appropriate measures of market power or competition. The present paper abstracts from strategic considerations. Following Novshek (1980), a second interpretation is that more competition means a closer approximation to perfect competition, i.e., a lower price-cost margin. In this paper, I take the second approach. In Section 4, I discuss various sources of market power, and show how the results derived in the theoretical model depend on these sources.

At this juncture, it is worth analyzing the ambiguous predictions the extant theoretical literature has provided in regard to the relationship between competition and managerial incentives. Different models have analyzed different channels through which product market fundamentals affect the incentive structure of executive pay. Hart (1983) identifies an *information effect* which asserts that greater product market competition facilitates the owner of a firm to distinguish aggregate from idiosyncratic shocks, and reduces the cost of incentives, and hence competition unambiguously improves managerial incentives. Scharfstein (1988) argues that Hart's (1983) result crucially depends on the specification of discontinuous preferences of the manager over income, and the result can be reversed under continuous preferences. Hermalin (1992) identifies three countervailing effects. When more stringent competition implies lower expected profit, the managers tend to consume fewer "agency goods" since they typically receive a share of firms' profit, which is the positive *income effect*. Second, the inherent riskiness of a firm varies with the competitive environment it operates in, and so does the actions of a CEO if he is not risk neutral. Higher volatility of firm's profit may thus result in lower managerial effort, which is the *risk-adjustment effect*. Finally, competition may change the difference in expected profits associated with different actions taken by a manager, which is the *change-in-the-relative-value-of-actions effect*, which is same as the 'value of managerial actions' effect in the current paper. If the marginal value of a 'better' action, say managerial effort is increasing (decreasing) with respect to the degree of product market competition, then greater competition leads to stronger (weaker) managerial incentives. Thus, the overall effect of competition on managerial effort is ambiguous. Schmidt (1997) also identifies two countervailing effects. The *value-of-cost-reduction effect* is the same as the third effect in Hermalin (1992). In addition to that, there is a *threat-of-liquidation effect* which asserts that greater product market competition implies that a firm is more likely to go bankrupt, and hence to avoid liquidation of the firm the manager tends to work harder since liquidation implies a loss of his reputation. Raith (2003) considers a model with risk averse managers and free entry under price competition in a Salop circle. A more competitive market is characterized by lower entry costs, since it induces a higher number of firms in equilibrium. Raith (2003) finds that competition increases managerial incentives. In the present paper, I abstract from all but one of the aforementioned effects, and concentrate on the 'value of managerial actions' effect, and show how this effect influences managerial incentives via an endogenous firm–manager matching.

Recent empirical literature (e.g. Ackerberg & Botticini, 2002; Chiappori & Salanié, 2003) on incentive contracting claims that endogenous principal–agent matching is an important determinant of optimal contracts in the principal–agent relationships. Ackerberg and Botticini (2002) argues that in order to study the effects of observed principal and agent characteristics on optimal contracts, empirical models typically regress contract choice on these parameters. They show that when there are incentives whereby principals of given types end up hiring agents of particular types, the estimated coefficients of a simple regression on the observed characteristics may be misleading. To understand this point in the current context, suppose that there are two types of managers (high and low talent), and two types of firms (high and low market power). Standard agency models (with one firm and one manager) would predict weaker incentives (measured in terms of bonuses) for the more talented managers since it is relatively easier to incentivize them to exert high effort. Now suppose that the bonus offered by each firm is a proportion of the additional profit generated by cost reduction, and that this marginal profit is higher in firms with high market power. This would induce such firms to hire the more talented managers by offering stronger incentives. Hence, stronger incentives will be associated with high talent. Therefore, the outcome of a talent assignment model will give prediction about the relationship between talent and incentives which is exactly opposite to what would have been predicted by the standard agency theory.

Two papers closely related to the current work are Barros and Macho-Stadler (1998), and Wright (2003). In Barros and Macho-Stadler (1998), talent affects the profitability of the firm the manager works for. Other things being equal, greater talent implies higher production. The firms differ in initial market size, and hence differences in market size implies differences in market power. Barros and Macho-Stadler show that talent has greater effect in the firm with greater market power, and hence this firm ends up hiring the more talented manager. Although it is not explicitly specified in Barros and Macho-Stadler (1998), the positive sorting between market size and managerial talent is determined by the fact that the firm with greater market size benefit more at the margin by employing the more talented manager. Wright (2003), in a more general context, considers competition among heterogeneous firms for managers who differ in their attitude towards risk, and find that less risk averse managers are lured into firms with greater marginal benefit of managerial effort. The current paper complements Wright's (2003) work by explicitly identifying the firms that have greater marginal benefit of effort under different scenarios (see Section 4). On the other hand, it generalizes Barros and Macho-Stadler (1998) by establishing that different sources of market power such as market size, price cap regulation, technological efficiency, etc. may have different implications for firm–manager assignment and managerial incentives.[1]

2. The model

2.1. Firms and managers

There are two classes of agents in the economy: a continuum $I=[0, 1]$ of risk-neutral firms and a continuum $J=[0, 1]$ of risk-neutral managers. The sets I and J are endowed with Lebesgue measure 1. Each firm is assumed to be a monopolist in the respective product market which may be justified by the presence of huge setup costs that firms require to incur to start operations. Therefore, a firm and the market where it sells its product are

[1] In contexts not related to the current one, a few other papers also incorporate moral hazard into talent assignment models in order to analyze the implications of the firm and manager characteristics for managerial incentives. Edmans, Gabaix, and Landier (2009) consider assignment of managerial talent to firm size, and show that more talented CEOs manage larger firms since talent has a greater effect in such firms. They assume that a CEO's payoff is multiplicatively separable in consumption and effort which generates empirical predictions that are different from the traditional additive models. Baranchuk, MacDonald, and Yang (2011) consider assignment of risk-averse executives to risk-neutral firms, and show that the firm size (measured by the number of divisions in a firm) is endogenously determined in equilibrium and more talented CEOs work for larger firms.