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Participation in moral hazard problems

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ABSTRACT

Two principals engage in Hotelling competition for an agent's services under incomplete information as to her outside option (location). This renders the agent's participation decision probabilistic from the perspective of each principal. Regardless of the market structure at equilibrium the optimal contract features a trade-off between participation probability and incentives. Rent and effort are inversely related and non-monotonic in the agent's transport cost and so in market structures; they increase (decrease) with competition. Uncertainty as to the agent's location may increase or decrease the rent compared to full information. This correspondingly harms or benefits principals.

1. Introduction

The canonical model of moral hazard takes the agent's outside option as exogenous and known to the principal designing the incentive contract. Assuming so is natural to focus attention on the incentive problem, which is then the sole source of frictions.

This assumption does not match most situations. In the labor market for example an employer must overcome both the "compensating differential" (see for example Rosen, 1983) and the terms of any competing offer.[2] It is easy to argue that in most cases that information is private to the prospective employee. We see this routinely in academic recruiting, where new hires have idiosyncratic preferences. Some people refuse to work for tobacco manufacturers or for defense contractors on ethical grounds. Overcoming this compensating differential can be costly: when he was hired away from Royal Bank of Scotland by Westpac (an Australian bank) CEO Brian Hartzer was reportedly paid a lump-sum of $7M to be lured.

Casting aside the question of participation is not without loss because the participation decision interacts with the incentives through wealth effects. That is, information about the agent's outside option has a bearing on the optimal contract. A new *participation-incentive* trade-off emerges, with consequences for the power of incentives and therefore the optimal action.

To introduce competition and uncertainty I embed a principal–agent problem in a Hotelling model. Principals are located at the extremes of an interval containing a single agent whose location is her private information. The Hotelling structure

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[2] "[F]irms and workers exchange wage-job attributes bundles in an implicit market." (Ho, 2012).

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allows for the interpretation of the total transport cost (distance × unit cost) as the compensating differential. Alternatively the distance between the agent and a principal can be interpreted as the degree of fitness of a match. A better match is more productive here because it allows for stronger incentives to be offered.

The participation-incentive trade-off arises because how important it is to secure participation depends on the principals' expected payoff – not on the agent's exogenous outside option. To transfer utility to the agent most efficiently principals improve the insurance properties of the contract. Inframarginal types respond by selecting a lower action than they otherwise would, which entails a social cost. This connection between insurance and effort underpins most results.

When principals compete even the marginal agent receives a rent, and increasing competition exacerbates rent-giving: the (endogenous) outside option of the agent increases, and the principals must offer more. This also induces weaker incentives through the insurance effect. Hence with more substitutable, or with more profitable, principals, the agent receives a higher rent and works less. This is reminiscent of the dot-com bubble of the late 1990's, when firms competed for workers for very little effort in return.[3] To counter this costly rent-giving employers, if they could, should emphasize differentiation.

Incomplete information has ambiguous effects on rents and effort that depend on the agent's location. When she is very contestable, incomplete information tames Bertrand competition for the agent because the participation-incentive trade-off caps rent-giving. So if they could, firm should commit to remain ignorant of the worker's outside option some of the time. Conversely, a principal cannot take advantage of the agent's proximity and offer a "cheap" contract; the participation-incentive trade-off, not the actual location, pins the marginal participating type.

The optimal action is non-monotonic in the transport cost. For a high transport cost the principals operate as local monopolists; the outside option is high and renders effort costly. Participation mechanically increases as the transport cost drops, which modifies the participation-incentive trade-off; the cost of effort decreases. Incentives become stronger, until principals start competing. At that point the marginal type becomes increasingly contestable and is thus able to extract an increasing rent; then effort drops. To return to the introductory application, both compensating differential and competing offer(s) matter, depending on the equilibrium market structure.

This paper belongs to the broad literature on moral hazard (Mirrlees, 1975; Holmström, 1977, 1979; Rogerson, 1985b; Page, 1987; Jewitt, 1988; Conlon, 2008, 2009). More closely related is the work of Kadan and Swinkels (2010), who study a principal's incentives to alter the agent's action as payment constraints vary. Their principal employs more than one agent whose reservation utilities are observable. The participation problem is standard but with more than one agent, the principal may either ask less effort of everyone, or employ fewer people and ask more effort of them. The single-agent framework neutralizes these incentive problems and focuses on participation.

I purposefully do not adopt a model of common agency (Aubert, 2005; Célérier, 2012). Common agency drastically modifies the principals' incentives in their contract offers, and therefore the agent's action in response. In Bisin and Guaitoli's work (2004) competing principals may offer contracts that induce the low action in equilibrium; they feature full insurance and generate zero profit. Principals may induce the high action and secure positive profits by also offering latent contracts that are not active in equilibrium. These latent contracts deter the other principals from offering more attractive contracts. Attar et al (2006, 2007a, 2007b) show that restricting attention to take-it-or-leave-it offers in such a context entails a loss of generality. Exclusive contracting (here) allows for take-it-or-leave-it offers and affords a clean characterization. Parlour and Rajan (2001) also study common agency however without asymmetric information; instead failure is strategic. The incentives of agents to engage in strategic failure weakens the principals' incentives to compete for agents; it breaks the Bertrand logic. Here the Bertrand logic is broken by the participation-incentive trade off.

There is a burgeoning literature on moral hazard in a market context (Besley and Ghatak, 2005; Dam and Pérez-Castrillo, 2006; Macho-Stadler et al., 2014; Serfes, 2008; Terviö, 2008). All these papers feature heterogeneous agents, an assignment problem and no private information. A good match is important because agent's characteristics affects their productivity; for each (publicly observable) type there exists an optimal contract. Through competitive matching an agent's outside option is given by the next best match – the competing offer in this paper. But here heterogeneity is orthogonal to productivity so types cannot be screened and heterogeneity does not enter the incentive problem. This paper also departs from Besley and Ghatak (2005) precisely because the agent's type affects her outside option but not her productivity. Serfes (2008) and Dam and Pérez-Castrillo (2006) show that identical principals obtain identical profits (zero when the market is short on agents). Here the principals always receive ex ante positive profits under uncertainty thanks to the participation-incentive trade-off, even though the market is always short on agents.

As in Jullien (2000) and Maggi and Rodriguez-Clare (1995) the outside option is type dependent. But it does not affect the agent's production technology, and so does not directly affect incentives. This paper also bears an obvious connection to the work of Rochet and Stole (2002), who study random outside option under adverse selection. Further discussion of the relation between their work and this one is postponed to Section 5.

[3] Witness "tolinrome"'s (a pseudo) account: "Everyday we had catered lunches, I mean nice stuff [...] IT employees had their DSL bills paid every month and they paid for everyone's cell phone [...]. They even flew me twice to HQ in SF for a meeting and paid everything [...] I worked about 2 hours a day and spent the rest of the time cruising around SF. Another time we had an IT meeting there, flew me out again, stayed at a ranch in Napa valley area, horseback riding, spa, everything." Source: http://techtalk.dice.com/t5/Off-Topic-Other-Archive/Crazy-stories-from-the-dotcom-peak/td-p/128704.