



# An experimental comparison of incentive contracts in partnerships



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## ABSTRACT

Empirical work comparing individualized sharing and equal sharing schemes in partnerships has produced mixed results. Some studies find individualized sharing schemes superior, others find no difference, and still others find equal sharing schemes superior. This paper outlines a theory which reconciles these competing findings, and tests it with an experiment. We find that in conditions of high synergy (when the teammate's effort has a proportionately larger impact on an agent's output than the agent's own effort), equal sharing schemes outperform individualized sharing schemes, while in conditions of low synergy, individualized sharing schemes outperform equal sharing schemes. These results are consistent with observations from the field. Our results have the potential to guide firms choosing between competing compensation contracts by identifying situations under which each contract type is likely to yield increased productivity.

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## 1. Introduction

Partnerships are commonly observed in firms, representing 100% of the top 100 law firms, 56% of the top 100 accounting firms, and 18% of the top 100 architecture firms (Greenwood & Empson, 2003). Labor contracts within partnerships take varying forms.

Two common forms involve individualized sharing schemes and equal sharing schemes.<sup>1</sup> As the names suggest, in individualized sharing schemes the compensation of partnership members is their own individual output,<sup>2</sup> while in equal sharing schemes, their compensation is a function of the team output. In practice, however, individual output is often a function not only of one's own efforts, but of others' efforts as well (Alchian & Demsetz, 1972). This effect is referred to as team synergy (Lawford, 2003).

Synergy effects can be frequently observed in partnerships. In a medical partnership, for example, the number of surgeries a doctor can perform (and be paid for) may depend on their partners' availability for collaborations. Although synergy is a common feature of partnerships, its impact on the efficiencies of various incentive contracts is still vaguely understood and has not been systematically examined in the literature (Alchian & Demsetz, 1972; Rose, 2002).

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<sup>1</sup> Also known as individual output contracts, individual-based contracts, or independent performance pay, and team output contracts, team-based contracts or joint performance pay.

<sup>2</sup> Note that individualized sharing schemes are slightly different than piece rates. In a piece rate compensation scheme, the firm takes a share of the profits; in partnerships all profits are distributed to the partners.

Observational and experimental evidence comparing the effectiveness of equal sharing and individualized sharing has been mixed, with some studies finding individualized sharing superior (Encinosa, Gaynor, & Rebitzer, 2007; Gaynor & Gertler, 1995; Nalbantian & Schotter, 1997), others finding no difference (Dijk, Sonnemans, & Winden, 2001; Vandegrift & Yavas, 2011), and still others finding equal sharing superior (Chan, Li, & Pierce, 2012; Hamilton, Nickerson, & Owan, 2003; Pizzini, 2010).

In this paper we provide an organizing explanation for these mixed results. We show both theoretically and experimentally that when team synergy is high (characterized by a large degree of complementarity between one's own effort and the effort exerted by teammates), equal sharing schemes outperform individualized sharing schemes. When team synergy is low, the opposite is true.

The intuition for our result is straightforward. Equal sharing schemes internalize effort externalities but include incentives for free riding. When effort externalities are sufficiently high, the former effect outweighs the latter and equal sharing schemes outperform individualized sharing schemes. When effort externalities are not sufficiently high, the free-riding incentives outweigh the benefit from internalizing the effort externality, and individualized sharing schemes outperform equal sharing schemes.

Our results are consistent with previous observations from the field, including the prevalence of equal sharing in high-synergy specialties (for example, emergency medicine) and the dominance of individualized sharing in low-synergy specialties (for example, psychiatry) (Adams, 2006; Pauly, 1996; Pizzini, 2010). Finally, our results have the potential to guide partnerships choosing between competing compensation contracts by identifying situations under which each contract type is likely to yield increased productivity.

## 2. Previous work

Observational work has documented the prevalence of both individualized and equal sharing schemes in partnerships. For example, Encinosa et al. (2007) report that 38.3% of medical groups use equal sharing schemes, while the rest use individualized sharing schemes. We argue that these types of partnerships have varying levels of synergies, and that this can explain the differential use of the various incentive schemes.

Both observational and experimental data has compared the efficiency properties of these schemes, with mixed results. Some studies have found that equal sharing schemes underperform individualized sharing schemes. For example, Encinosa et al. (2007) find that for large medical groups, team productivity is lower under equal sharing, while Gaynor and Gertler (1995) find that equal sharing schemes generate fewer office visits for doctors. Nalbantian and Schotter (1997) run a lab experiment in which equal sharing schemes generate significant free-riding and lower levels of productivity than individualized sharing schemes. Erev, Bornstein, and Galili (1993) find similar results by using a real-world task of picking oranges. The samples investigated in the former two studies on medical partnerships mainly consist of specialties of low synergy.<sup>3</sup> The experimental settings of the latter two studies similarly do not allow for the possibility of production interdependence among participants, thus involve no synergies. We argue that the lack of synergies results in equal sharing underperforming individualized sharing.<sup>4</sup>

In contrast, other studies have found that equal sharing schemes outperform individualized sharing schemes. Hamilton et al. (2003) find a 14% increased productivity in a garment plant that switched from individual output to team output contracts. Chan et al. (2012) and Pizzini (2010) find similar effects in a field experiment run in department stores cosmetic counters and in medical partnerships respectively. Hamilton et al. (2003) investigate manufacturing workplaces, which usually involve high synergy levels due to the extensive production interdependence in their operational lines (Adams, 2006). Chan et al. (2012) find that the advantage of equal sharing over individualized sharing increases if peer productivity spillovers increase. Pizzini (2010) finds that equal sharing schemes are more prevalent in the specialties with substantial production interdependence (e.g., anesthesiology, radiology, and general surgery). These results are thus consistent with our argument that equal sharing is superior under high synergy.<sup>5</sup>

<sup>3</sup> Pauly (1996) and Pizzini (2010) argue that doctors sometimes engage in teamwork (for example, collaborate to perform complex surgeries or administer emergency care), depending on their specialties. Pizzini (2010) rates major medical specialties in terms of production interdependence (see Table A-1, Pizzini, 2010). Using Pizzini's rating, we find that only about 8% partnerships investigated in Encinosa et al. (2007) and 1 out of 4 specialties investigated in Gaynor and Gertler (1995) involve high synergy, while the rest involve low synergy.

<sup>4</sup> Two previous experiments demonstrate no differences between contractual types in settings of no synergies. Dijk et al. (2001) run an experiment in which participants solve a two-variable optimization problem. Vandegrift and Yavas (2011) run an experiment using a forecasting task. However, in both studies participants were grouped and provided with their teammates' performance under equal sharing but not individualized sharing. It is possible that this information induced competitive preferences, raising efforts in equal sharing but not individualized sharing settings (Dijk et al., 2001; Gneezy, Niederle, & Rustichini, 2003; Vandegrift & Yavas, 2011).

<sup>5</sup> What might cause conditions of high (or low) synergy? Hamilton et al. (2003) suggest that heterogeneity of ability within a team is one such cause, as more skillful workers can teach the less skillful how to execute tasks efficiently, yielding significant long-term increases in productivity. Evidence on this question, however, is mixed. Two experiments involving no producing interdependence (and thus no synergies) but with heterogeneity of worker ability generate different results. Meidinger, Rullière, and Villeval (2003) report that equal sharing performs poorly in this setting, while Vandegrift and Yavas (2011), report that heterogeneity of ability increases the efficiency of equal sharing. This increased efficiency, however, is only found in men, and (as mentioned in footnote 4) might be driven by competitive preferences. While not the focus of this paper, future work is needed to understand the relationship between ability heterogeneity and performance under different contractual terms.

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