



Risk-sorting and preference for team piece rates

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ABSTRACT

Incentive schemes not only influence the effort provision of workers, but might also induce sorting. As drivers of self-selection, the literature mainly focuses on measures of productivity; however, other variables, such as preferences, beliefs and personality, also play a role. With this paper, we contribute to the literature on drivers of self-selection by analyzing the role of perceived wage risks as potential influences on the sorting decision. To this end, we study a sorting decision between two variable compensation systems, where both options carry wage risks. Specifically, we look at sorting between individual piece rates and team piece rates.

Using experimental data, we find evidence for both risk diversification considerations and free-riding concerns (i.e., risk of teaming-up with low-productive teammates) as drivers of self-selection. However, our data does not support the concern of our experimental subjects that others actually reduce their effort when working under team compensation, as compared to individual-based compensation.

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1. Introduction

A central finding in the organizational economics literature is that different incentive contracts can cause output differences not only with the incentive effects but also with the sorting effects (e.g., Curme & Stefanec, 2007; Eriksson & Villevall, 2008; Lazear, 2000). Productivity, however, is not the only driver of self-selection: individuals' preferences, beliefs, and personality dimensions influence sorting decisions, too. The sorting literature mostly focuses on the choice between *fixed* and *variable payment schemes*. In these decision situations, theoretical predictions and empirical findings rarely differ. For instance, risk-averse workers are more likely to self-select into fixed rather than variable payment schemes (Dohmen & Falk, 2011). Given that fixed payment schemes carry no wage risk but variable payment systems do, this finding is not surprising. The situation is fundamentally different if we analyze sorting *within* two variable payment schemes because both carry wage risks. Here, the sorting behavior of rational agents should depend on their expectations of the agents' own and others' performance, making predicting outcomes much more difficult. This paper focuses on self-selection *within* variable payment schemes and analyzes the role of risks in sorting.

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We analyze sorting between incentive systems where payment is based on individual output (here individual piece rates) or team output (here team piece rates). These schemes mainly differ regarding (1) whether payoffs depend on one's own performance only (individual piece rate) or also on a co-worker's performance (team piece rate), and (2) whether individuals have the opportunity to diversify their own idiosyncratic risk (team piece rate) or not (individual piece rate). Thus, payment based on team output carries the risk of low-productive co-workers and, thus, lower pay (e.g., Cooper, Dyck, & Frohlich, 1992; Holmstrom, 1982; Kvaløy & Olsen, 2006; McAfee & McMillan, 1991), but allows the team members to diversify their own idiosyncratic risk (Breton, St-Amour, & Vencatachellum, 2003; Gaynor & Gertler, 1995), i.e. luck or subjective productivity shocks such as mood effects or other psychological aspects of motivation or distraction (Dohmen & Falk, 2011). Individual-based pay is independent of others' performance but does not offer a diversification option. Taken together, individual payment may be more or less risky, depending on expectations about the individual's own and others' performance and the individual's own idiosyncratic risk.

The risk diversification aspect of team-based compensation has rarely been discussed in the literature, just as team incentives in general (Bandiera, Barankay, & Rasul, 2012). Consequently, we do not know whether individuals consider risk diversification when making their sorting decision. We address this research gap and analyze whether the perceived risk of low-productive co-workers and/or the perceived idiosyncratic risk influence the sorting decision between individual- and team-based compensation. To the best of our knowledge, no previous study has analyzed the potential effects of these two risk aspects in detail. However, some studies have shown that potential teammates' productivity influences sorting between individual work and teamwork (e.g., Breton et al., 2003; Hamilton, Nickerson, & Owan, 2003). Another strand of the literature examined risk diversification in other contexts (e.g., Bramoullé & Kranton, 2007a; Eisenhardt & Schoonhoven, 1996; Li & Suen, 2000). For example, in a theoretical paper, Chiang and Mahmud (2008) analyze the optimal size of nations by considering which regions are likely to form a coalition given, among other factors, the variance in income.

To tackle the research gap regarding risk-sorting effects, we conduct a real-effort experiment consisting of nine stages: First, we measure participants' individual productivity levels by the number of correctly solved arithmetic tasks. Then we introduce three treatment conditions characterized by different levels of idiosyncratic risk: people are informed that at the end of the work period a given number (zero, low or high) will be added to or subtracted from the actual number of correct calculations. Then we study the sorting decision between two variable payment schemes: payment based on individual output (individual piece rate) or team output (team piece rate). In addition, we elicit participants' risk perceptions of getting matched with a low-productive co-worker. Last, we obtain participants' risk and social preferences, and individual characteristics. Our experimental design partly resembles that of Sloof and van Praag (2010), who analyze the impact of low vs. high noise in performance measurement on the provision of effort. We use the same real-effort task and integrate their operationalization of noise, i.e., idiosyncratic risk, into a multi-stage experimental design (see Dohmen & Falk, 2011 for a similar set-up¹).

By studying the sorting decision between individual- and team-based payments rather than between individual work and teamwork, we isolate the wage risk aspects from interfering effects such as the social desirability of teamwork, a preference for social interaction, or the impact of social ties on decision-making (Sonnemans, van Dijk, & van Winden, 2006). In particular, team production is unaffected by intra-team spillovers and talent disparity.² Our setting reflects particular real-life situations where economic agents can choose to share individual production risks, e.g., individual farmers in a co-op, spouses with joint accounts, or waitresses pooling tips.³

Our experimental data support a risk diversification effect and an effect of the risk of being matched with a low-productive co-worker on sorting between individual and team piece rates. Specifically, we find perceived idiosyncratic risk relates positively to the likelihood of sorting into team piece rates. Apparently, individuals are aware of the existence of risk diversification effects under team piece rates, and opt for them whenever the idiosyncratic risk is too high. However, counterbalancing this positive effect on the attractiveness of team piece rates, we also find a negative effect of the perceived risk of being matched with a low-productive co-worker. Given that the marginal effect of this latter risk is greater and of higher statistical significance than that of idiosyncratic risk, we suggest that concerns regarding the productivity of potential co-workers might be stronger than risk diversification considerations. We do not observe free-riding tendencies for workers who sorted into teams: Although we indeed observe lower average productivity under the team-based scheme, this is entirely due to sorting and not due to a reduction in effort, the major concern the literature focuses on.

The paper is organized as follows. In Section 1, we introduce our concepts of idiosyncratic risk and the risk of low-productivity co-workers and derive theoretical implications regarding their impact on sorting. In Section 2, we describe the experimental design and procedures. In Section 3, we present the descriptive and multivariate results. In Section 4, we conclude.

2. Wage risk aspects of individual piece rates and team piece rates

In most work situations, output is not exclusively determined by effort or abilities, but is also subject to some risk in the form of exogenous shocks. These shocks can be common, i.e., they affect the output of all workers equally, or idiosyncratic,

¹ While we analyze sorting between individual and team piece rates, Dohmen and Falk (2011) look at fixed compensation vs. different variable payment schemes.

² For a different perspective, see Franck and Nüesch (2010), who find talent disparity effects in soccer.

³ Of course, the diversification of idiosyncratic risks is also the main principle underlying insurance.

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