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A Crowding-Out Effect for Relative Income

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Abstract:

The risk of external interventions crowding-out intrinsic motivation has long been established in economics. This paper introduces a *new dimension* by arguing that a crowding-out effect does become possible if individuals receive higher *relative* compensation. Using a unique, large data set that focuses on 26 seasons in basketball (NBA) we find empirical support for a *relative crowding-out effect*. Performance is reduced as a reaction to a relative income advantage.

JEL Classifications: D000, D600, L830

Keywords: Crowding-out, relative income, positional concerns, motivation

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1. Introduction

That external interventions may under some conditions crowd-out intrinsic motivation has long been well established in economics. It represents a particularly important "anomaly" to standard economics because it proposes an effect working in the opposite direction to the fundamental relative price effect: When monetary compensation is increased performance *decreases* (rather than increases) if the crowding-out effect proves stronger than the relative price effect. The crowding-out effect is of obvious importance for compensation policy.

The existence of a crowding-effect has been proposed early on by Titmuss (1970). It has been given a perception and/or signalling interpretation (see Akerlof and Kranton 2008, Bénabou and Tirole 2003, Frey 1997, Prendergast 2008). A large number of experimental trials and field experiments that relate to economics have been performed (e.g. Frey and Oberholzer 1997, Gneezy and Rustichini 2000a,b; for a survey see Frey and Jegen 2001).

This paper introduces a *new dimension* to this motivational effect. It is argued, and empirically tested, that there also exists the possibility of a crowding-out effect when individuals receive higher *relative* compensation. The importance of relative income has been highlighted by Veblen (1899), Duesenberry (1949) and Frank (1985). Several models have been developed analysing that individuals seek to maximize well-defined preferences depending on the consumption or income of others (see Bolton 1991, Bolton and Ockenfels 2000, Charness and Rabin 2002, Fehr and Schmidt 1999 and Sobel 2005 for an overview). Research on happiness using survey data (e.g. Clark and Oswald 1996, Easterlin 2001, Frey 2008, Frey and Stutzer 2002, Layard 2005) also finds strong empirical support for the importance of relative income.

According to the *relative crowding-out effect* an individual's intrinsic motivation to perform is undermined when relative income position improves. Relative income gain may be interpreted as a signal of that their position compared to others is considered to be of overriding importance by their employers, and/or that they perceive that their behaviour is more strongly controlled by their superiors.

2. Data

Empirical studies of the effects of income differences on individual behavior have been hindered by the lack of data on individual performance and the lack of publicly available income data. In contrast, in basketball, individual and team performance is well defined and can be readily observed. There is a growing literature successfully demonstrating the advantages of working with sports data (see, e.g., Goff and Tollison 1990, Rosen and Sanderson 2001, or Szymanski 2003). This paper uses a unique data set of professional basketball, the National (American) Basketball Association (NBA) over 26 seasons between 1979 and 2006. The data includes not only the contract salary but also additional salary components such as bonuses. A composite index for the individual performance of a basketball player relies on the basic idea to add all the "good things" that a player can do such as points scored (*PTS)*, total rebounds (*TREB)*, steals (*STL)*, blocks (*BLK)*, and assists (*AST)* and then subtract the "bad things", namely turnovers (*TO)*, field goals missed (*FGMS)* and free throws missed (*FTMS*). This performance index is divided by the number of games played.

$$PERF_{Basketball} = \frac{(PTS + TREB + STL + BLK + AST) - (TO + FGMS + FTMS)}{GP}$$

While using equal weights can be criticized, this indicator still provides a good indicator for *changes* in individual performance.

3. Empirical Models

Investigating the pay-for-performance relationship requires a model that takes the incentive effects of absolute and relative pay into account. Doing so, our model captures whether a player's current performance is affected by his future pay assuming that player's current performance is not affect by the amount of money he or she has already been paid. Instead, a major factor influencing current performance is future pay. Individuals' performances are motivated by what they expect to receive in the future. As data on individuals' perceptions are not available we assume that the best available proxy for individuals' perceptions is actual future pay. Thus, our specification has the following structure:

$$PERF_{it} = \beta_0 + \beta_1\, CTRL_{it} + \beta_2\, RELADV_{i(t+1)} + \beta_3\, RELDISADV_{i(t+1)} + \beta_4\, ABSAL_{i(t+1)} + TEAMD_i + TD_t + I_i + \varepsilon_{it},,$$

where $PERF_{it}$ is the performance of player i at time t. $ABSAL_{i(t+1)}$ is the future salary of a player and $RELADV_i$ (relative income advantage) is defined as $\frac{1}{N-1}\sum_{j\neq i}\left(S_i - S_j\right)$, where $S_j < S_i$. On the other hand, $RELDISADV_i$ (relative income disadvantage) is measured as $\frac{1}{N-1}\sum_{j\neq i}\left(S_j - S_i\right)$, where $S_j > S_i$, with S_i = individual salary. In addition, S_j is the salary of the reference group members (teammates). Moreover, we have included team dummy variables ($TEAMD_i$), as it can be argued that the results are driven by unobserved team characteristics that are correlated with income and performance. Team fixed effects allow us to control for such possible omitted variable bias. We also consider time dummies (TD_t) to control for possible differences in the players' environment. Finally, I_i is the individual effect of player i, and ε_{it} denotes the error term. We control therewith for ability since player fixed effects account for any omitted variables (player characteristics) that do not change over time.

A model using future pay assumes that a player is able to predict his and other players' future income situation, and therefore his relative income position. However, individuals may have difficulties predicting their future utility and tastes (for an overview, see, for example, Loewenstein, Donoghue and Rabin 2003). The robustness of the results is therefore checked using present rather than future earnings as a reference point. The second specification is:

$$\mathrm{PERF}_{it} = \beta_0 + \beta_1\, \mathrm{CTRL}_{it} + \beta_2\, \mathrm{RELADV}_{it} + \beta_3\, \mathrm{RELDISADV}_{it} + \beta_4\, \mathrm{ABSAL}_{it} + \mathrm{TEAMD}_i + \mathrm{TD}_t + \mathrm{I}_i + \varepsilon_{it}$$

3. Results

Table 1 presents the estimation results.

TABLE 1 about here

The estimates reveal the relative importance of the variables used. To obtain robust standard errors in these estimations, the Huber/White/Sandwich estimator of standard errors is used. The table also shows the results when standard errors by players are clustered to pick up any player-specific characteristics that change over time. Considering the twenty-six basketball seasons, players' ability can be taken to have a fixed and a variable portion.

The results suggest that *relative income position (above and below* the average*)* have a statistically significantly *negative* effect on performance. In contrast, the coefficients for absolute income are statistically significantly *positive* throughout. Players care about the salary distribution within the team (reference group) and not just about their own salary. The results indicate the tendency of a *stronger performance decrease for players having a relative income advantage* controlling for the absolute income. This finding is consistent with the relative crowding-out effect. Having a relative income advantage may affect performance in a negative way reducing the intrinsic motivation to perform. Thus, our findings complement this literature by noting that a crowding-out effect may also appear at the relative and not just the absolute compensation level.

4. Conclusions

This paper presents novel empirical evidence that social comparisons matter in competitive environments such as sports markets. Our unique large data set that focuses on 26 seasons in basketball explores athletes' pay and performance relationship in a controlled environment.

We find support for a *relative crowding-out effect*. Performance is reduced as a reaction to a relative income advantage, while absolute incentives affect performance positively. Thus our regression results support theories of personal motivation, stressing the relevance of a performance crowding-out effect at the upper income level. Previous studies are complemented, by showing that such a crowding-out effect may refer to the *relative*, and not only to the absolute income level.

Using data from professional sports has, of course, its limitations. Average salaries paid in professional basketball are higher than in most other occupations. Moreover, our results may not necessarily be transferred to situations in which pay and performance are less visible or less easily measured. Nevertheless, the results may be relevant for employees in corporations as they often work in teams, that are to some extent similar to sports teams. Lessons can be learned for the design of incentive and reward mechanisms. The results are also relevant in areas where relative income and rank ordering are of special importance such as in consulting, law partnerships, and academia.

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Table 1: Crowding-Out Effect

Dep. V.: ProdNBA (per game)	Future Model			Present Model		
	OLS	CLUST	FE	OLS	CLUST	FE
SALARY						
RELATIVE SALARY ABOVE	**-.361***** **(-5.61)**	**-.909***** **(-4.34)**	**-.593***** **(-4.67)**	**-.289***** **(-5.13)**	**-.832***** **(-3.83)**	**-.0557** **(-0.46)**
RELATIVE SALARY BELOW	-.122*** (-6.80)	-.663*** (-5.39)	-.336*** (-3.95)	-.194*** (-10.12)	-1.05*** (-7.48)	-.432*** (-5.26)
ABSOLUTE SALARY	.947*** (13.28)	1.83*** (10.24)	.689*** (6.06)	.77*** (11.64)	1.67*** (8.70)	.124 (1.13)
PLAYER'S CHARACTER						
AGE	.234 (1.93)	.38 (1.40)	3.99*** (20.10)	.399*** (3.88)	.641** (2.71)	4.4*** (25.59)
AGE SQUARE	-.247* (-2.06)	-.00722 (-1.50)	-.0798*** (-24.38)	-.483*** (-4.77)	-.0138*** (-3.32)	-.0844*** (-33.32)
TEAM	Yes	Yes	Yes	Yes	Yes	Yes
SEASON	Yes	Yes	Yes	Yes	Yes	Yes
PLAYER	No	No	Yes	No	No	Yes
F-Test joint significance (REL. & ABOLUTE INC.)	960.02*** 0.000	448.56*** 0.000	49.08*** 0.000	976.21*** 0.000	430.00*** 0.000	27.38*** 0.000
R-Squared	0.384	0.384	0.288	0.330	0.330	0.322
F	64.13***	38.13***	30.73***	64.65***	36.74***	48.92***
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000
Groups (Players)		1161	1161		1512	1512
Number of Observations	5470	5470	5470	7656	7656	7656

Notes: *,** and *** denote statistical significance at the 90%, 95% and 99% level. *t*-statistics in parentheses. [a] *beta* or *standardized* regression coefficients.

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