Positive Self-Image in Tournaments

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INTRODUCTION

• According to Myers (1996):

“On nearly any dimension that is both subjective and socially desirable, most people see themselves as better than average.”
CAR DRIVERS

• A comprehensive study on driving behavior in Europe (SARTRE 2004) asked car drivers:

• “Compared to other drivers, do you think your driving is .................. dangerous?”

• Drivers could pick one out of five answers to fill the gap: “much more”, “a bit more”, “equally,” “a bit less,” and “a lot less”.
### CAR DRIVERS

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<th>Country</th>
<th>% who think to be less dangerous drivers than others</th>
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MANAGERS, FUND TRADERS, INVEST. BANKERS, ENTREPRENEURS HAVE POSITIVE SELF-IMAGE

- 90 percent of business managers rate their performance as superior to their average peer (French, 1968).

- Only 1 percent of GE company employees rate their performance as below the median (Meyer, 1975).

- In Australia, only 1 percent of people rate their job performance as below average (Headey and Wearing, 1987).

EXPERIMENTAL ECONOMICS EVIDENCE

- Camerer and Lovallo (1999) show that entry in markets is higher when the distribution of prizes depends on relative skill.

- Park and Santos-Pinto (2005) find that players in poker and chess tournaments overestimate their relative performance.

- Some experiments suggest that PSI is reduced with economic incentives (e.g., Hoelzl and Rustichini, 2002), while others do not (e.g., Camerer and Lovallo, 1999).
MAIN RESEARCH QUESTION

- What is the impact of workers’ perceptions of skill on the employment relationship?
ESPECIFIC RESEARCH QUESTIONS

• Does worker positive self-image change the firm’s choice of optimal incentive scheme?

• Is worker positive self-image favorable or unfavorable to the firm?

• Does heterogeneity in workers’ self images have interesting implications for the composition of the workforce?
RELATED RESEARCH

• Two approaches:

  – Worker beliefs about skill are **endogenous** to the model
    Bénabou and Tirole (2003, RES)
    Moscarini and Fang (2005, JME)

  – Worker beliefs about skill are **exogenous** to the model
    Hvide (2002, JEBO)
    Gervais and Goldstein (2004)
    De la Rosa (2005)
    Santos-Pinto (forthcoming in EJ)
POSITIVE SELF-IMAGE IN TOURNAMENTS

• A tournament is an incentive scheme where the firm pays prizes to workers according to their relative performance (rank).

• Example: Promotions in organizations.

• Main finding:
  
  – Firms can benefit from worker positive self-image if they wisely structure prizes in tournaments.
TIMING OF A TOURNAMENT GAME


1. The firm chooses the winning and losing prizes;

2. Workers observe prizes and the realization of a common shock;

3. Workers choose simultaneously their effort level (effort choices are unobservable to the firm);

4. The output of each worker is a function of effort, ability, the realization of the common shock, and of an idiosyncratic shock;

5. The firm observes the workers’ rankings in terms of output and awards prizes to workers according to their ranking.
ASSUMPTIONS

- Two workers $i=1,2$ and two prizes $y_L < y_w$

- The firm maximizes profits

$$\pi = (Q^1(a^1) + Q^2(a^2)) - (y_L + y_W)$$

- Worker’s utility function

$$U^i(y^i, a^i) = u^i(y^i) - c^i(a^i)$$
ASSUMPTIONS

• A worker exhibits positive self image if he overestimates his productivity of effort.

• This factors into the problem through the worker’s perceived probability of winning the tournament:

\[ P^i (a^i, a^j, \lambda^i) = P(Q^i (a^i, \lambda^i) > Q^j (a^j)) \]

• Thus, the worker’s perceived expected utility is

\[ V^i = u(y_L) + P^i (a^i, a^j, \lambda^i) \Delta u - c(a^i) \]
WORKERS’ EFFORT CHOICE PROBLEM

• Worker $i$’s effort choice problem is given by:

$$\max_{a^i \geq 0} u(y_L) + P^i(a^i, a^j, \lambda^i) \Delta u - c(a^i)$$

• If positive self-image is not too excessive the solution to this problem implies a strictly positive effort level given by

$$P^i_{a^i}(a^i, a^j, \lambda) \Delta u = c'(a^i)$$
FIRM’S EFFORT IMPLEMENTATION PROBLEM

• The firm chooses the winner’s and the loser’s prizes such that

\[
\min_{v_L, v_W} \frac{1}{2} h(v_L) + \frac{1}{2} h(v_W) \\
\text{s.t.} \quad P(a, \lambda) \Delta v = c'(a) \quad \text{(IC)} \\
\quad v_L + P(a, \lambda) \Delta v \geq \bar{U} \quad \text{(IR)}
\]
SELF-IMAGE AND WILLINGNESS TO TAKE PART IN THE TOURNAMENT

- In a tournament, by definition, the workers’ wage-incentive scheme is increasing with output.

- Thus, for a fixed effort level, the impact of PSI on workers’ willingness to take part in the tournament is favorable to the firm.

- However, positive self-image may change effort provision.
SELF-IMAGE AND EFFORT PROVISION

• The impact of self-image on effort provision is given by:

\[
\frac{\partial a^i}{\partial \lambda} = - \frac{\partial^2 V / \partial a^i \partial \lambda}{\partial^2 V / \partial (a^i)^2} = - \frac{P_{a^i \lambda} \Delta u}{P_{a^i a^i} \Delta u - c''(a^i)}
\]

• Two possibilities

  – Effort and self-image are substitutes: \( P_{a^i \lambda} < 0 \)

  – Effort and self-image are complements: \( P_{a^i \lambda} > 0 \)
**RISK NEUTRAL WORKERS**

- **Proposition 1**: If workers are risk neutral then the firm is better off with a positive self-image workforce.

- **Intuition**: Worker risk neutrality implies that the firm can change the prize spread to implement any effort level at a lower compensation cost:

\[
C(a, \lambda) = \bar{U} + c(a) - \frac{P(a, \lambda) - \frac{1}{2}}{P_a(a, \lambda)} c'(a)
\]
RISK AVERSE WORKERS EFFORT AND SELF-IMAGE SUBSTITUTES

• **Proposition 2**: If workers are risk averse, effort and self-image are substitutes, and the impact of self-image on effort is not too large, that is,

\[-P_a \lambda / (1 - P) < P_{a,\lambda} < 0\]

then the firm is better off with a positive self-image workforce.
RISK AVERSE WORKERS
EFFORT AND SELF-IMAGE SUBSTITUTES

• Intuition:

  – The firm must increase the prize spread to counter the unfavorable impact of positive self-image on effort.

  – Worker risk aversion implies that workers must be compensated for the increase in the prize spread.

  – However, worker positive self-image makes participation in the tournament attractive to workers and allows the firm to reduce prizes.
RISK AVERSE WORKERS
EFFORT AND SELF-IMAGE COMPLEMENTS

- **Proposition 3**: If workers are risk averse and self-image and effort are complements, that is $P_{a^l \lambda} \geq 0$, then the firm’s welfare is higher with a positive self-image workforce.

- **Intuition**: For fixed prizes the firm gets more expected output with PSI workers than with accurate workers.
CONCLUSION

1. The paper finds that, under a variety of circumstances, firms can benefit from worker positive self-image if they wisely structure prizes in tournaments.

2. The finding is consistent with the idea that some parties involved in a contract might gain when other parties are not fully rational.

3. The workers are made worse off by positive self-image beliefs.

4. Overall welfare is reduced when workers are risk neutral. Overall welfare may increase when workers are risk averse.
THANK YOU!