

Lab Labor:

What Has Labor Economics Learned in the Lab?

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Laboratory Experiments have been used to address:

A. The Supply of Effort: Principal-Agent Interactions

B. Discrimination: Explaining gender, race and other differentials.

C. Aspects of Labor Market Equilibrium, including:

- unemployment (Fehr, Kirchsteiger, and Riedl *QJE* 1993)

- minimum wages (Brandts and Charness *EJ* 2004)

- signalling and screening, (Kuebler, Mueller and Normann *Games* 2008)

- search and matching (Kagel and Roth *QJE* 2000)

D. Arbitration and Bargaining (Ashenfelter, Currie, Farber and Spiegel, *Econometrica* 1992; Roth, Murnighan and Schoumaker, *AER* 2008).

Today, we only have time to discuss A and B.

A. Labor Supply and Principal-Agent Theory in the Lab

1. The Basic Principal-Agent Problem (one agent, one period, one task)
2. Multiple Agents: Tournaments
3. Multiple Agents: Teams
4. Multiple Tasks
5. Multi-period Principal-Agent Interactions
6. Social Preferences and the Supply of Effort

1. The Basic Principal-Agent Problem (One principal, One Agent, One Task, One Period)

- a) For pigeons and rats: Compensated wage cuts reduce effort; Leisure is normal; Uncompensated wage changes yield backward-bending labor supply curves (Battalio, Green and Kagel 1981; Battalio and Kagel 1985):
- b) For humans, higher piece rates raise effort (Swenson 1988, Sillamaa 1999a,b, Dickinson 1999). Agent self-selection reinforces these effects (Lazear 2000; Dohmen and Falk 2006, Cadsby et al. 2007)
- c) Zero wages can yield higher effort than low wages. Gneezy and Rustichini (2000).
- d) Effort also responds to the *intercept* of the compensation schedule, at least when generosity is seen as intentional (Fehr, Kirchsteiger and Riedl 1993; Charness JLE 2004, but see also Gneezy-List 2006).

- e) Effort decisions can be affected by at least one type of reference point that can be manipulated in the lab: the subject's expected earnings for the session (Abeler et al, 2009).

- f) Forcible restrictions on agents' choice sets can reduce the efforts of agents on whom they are not binding (Falk and Kosfeld 2006); but not when the restrictions are 'legitimate' (Schnedler and Vadovic 2007).

- g) A decision to use piece rates can also reduce agents' efforts, but perhaps because it changes agents' interpretation of the implicit contract (Irlenbusch and Sliwka 2005).

- h) A decision to monitor can reduce agents' efforts, but only when the agents 'know' the principal (Dickinson and Villeval 2008).

- i) Vague, unenforceable promises by principals to reward 'satisfactory' worker performance can elicit surprising amounts of effort, and can outperform more objective mechanisms such as random monitoring combined with punishment (Fehr, Klein and Schmidt 2007).

j) Sharp discontinuities in reward schedules invite workers to misrepresent their output (Cadsby et al., 2008).

k) Even when there is no strategic independence between workers, workers' efforts sometimes depend on their co-workers' efforts (Falk and Ichino 2006). Co-worker's wages, however, do not appear to affect effort (Charness and Kuhn 2007).

2. Tournaments in the Lab

-a properly-designed tournament can replicate the results of an efficient piece rate in expectation, but generally yields greater variance in output across agent groups (Bull, Schotter and Weigelt, 1987).

-handicaps improve the performance of tournaments between unequal agents, though some of this is because in the absence of handicaps the actions of less-able agents often diverge from Nash behavior (sometimes working too hard, sometimes dropping out completely) (Schotter and Weigelt 1992).

-excessive entry into tournaments does not appear to be a problem overall (Rapaport 1995), but may be for certain subgroups, such as MBAs (Camerer and Lovallo 1989) and men (Niederle and Vesterlund 2007). Allowing risk-averse agents to self-select out of tournaments reduces the between-group variance in output (Eriksson, Teyssier and Villeval 2009).

-tournaments can increase risk-taking (Vandegrift and Brown 2003); this effect is not necessarily confined to agents with a low probability of winning (Nieken and Sliwka 2008).

-increases in tournament prize spreads can raise sabotage as well as effort; this effect can be strong enough to reduce total output (Harbring and Irlenbusch 2005, Carpenter et al forthcoming). Agents do not always 'target' their sabotage in the expected direction though (Irlenbusch et al. 2007).

-collusion is rare in anonymous tournaments with more than two contestants (Harbring and Irlenbusch 2008).

-while tournaments reduce or eliminate principals' incentives to underreport total worker output or misrepresent the tournament's true winner (Carmichael 1983), tournaments do encourage principals to misrepresent workers' interim outputs by understating the gap between them (Gürtler and Harbring 2007). (But see also Ederer and Fehr 2007 and Erikson, Poulsen and Villeval 2008).

3. Teams

-the team production problem is closely related to the VCM problem, which has been extensively studied in the lab (see Chaudhuri forthcoming for a recent review).

-in the absence of communication and/or repeated interaction, teams in which agents are paid equal shares of the team's output perform poorly, with agents' efforts converging to low, individually rational levels after a few rounds of play (Isaac and Walker 1988; Nalbantian and Schotter 1997).

-the forcing contracts (essentially group bonuses) suggested by Holmstrom (1982) typically fail to improve outcomes in these environments, possibly due to co-ordination problems among agents (Nalbantian and Schotter 1997)

-team performance may be affected by apparent reciprocity towards the principal, if one exists (Meidinger, Rulliere and Villeval 2003).

-adding incentives based on the relative contributions of individual members to the team's output can improve teams' performance, if such measures are available (Dickinson and Isaac 1998; Dickinson 2001, Irlenbusch and Ruchala 2008).

-adding competition between teams can be more effective than any of the above strategies (Nalbantian and Schotter 1997).

-when there is complementarity between the efforts of team members, loss of output due to co-ordination failures can be severe in the absence of communication among team members (Van Huyck, Battalio and Beil 1990). Adding communication in such situations can generate dramatic improvements, much more so than strengthening financial incentives (Brandts and Cooper 2007).

-selection into teams has been addressed in the lab (Charness and Yang [endogenous group formation in a VCM; Weber (2005, 2006) [managers creating teams in the minimum-effort game], and in the field (Hamilton, Nickerson and Owan 2003; Bandiera, Barankay and Rasul 2009).

4. Multiple Tasks

-as predicted by the ‘standard’ model (Farrell/Shapiro 1989; Holmstrom/Milgrom 1991), rewarding the observable task via a piece rate while not rewarding the other yields poor outcomes, especially if the tasks are complements (Fehr and Schmidt 2004).

-unenforceable promises by the principal to reward ‘satisfactory’ overall performance by the agent perform remarkably well (Fehr and Schmidt 2004). Perhaps this situation is familiar to subjects and they act according to norms that are highly effective in the real world.

-when agents can choose to invest in an unproductive rent-diverting activity, raising the returns to that activity generates more of it. Agents seem neither to anticipate, nor to receive, increased rewards for refraining from such activity when it becomes more tempting for them to undertake it (Sloof and Sonnemans 2006).

5. Multiple Periods

Ratchet effects:

-Pooling equilibria at low effort levels in early periods can be generated in the lab (Cooper, Kagel and Lo 1999).

-As predicted, labor market competition essentially eliminates the ratchet effect (Charness, Kuhn and Villeval 2008).

Career concerns:

-Signal-jamming equilibria at high effort levels in early periods can be generated in the lab (Irlenbusch and Sliwka 2006; Koch, Morgenstern and Raub 2009).

-If agents choose efforts in both periods, then making effort publicly observable, rather than reducing first-period effort (because signal jamming is no longer possible), actually raises it (Irlenbusch and Sliwka 2006). Perhaps agents are signalling a personal willingness to work hard?

Firm-specific Training and Hold-up:

-even when short-term contracts *should* guarantee workers the same return to firm-specific investments as long-term contracts, long-term contracts induce more worker investments in firm-specific skills (Anderhub, Konigstein and Kubler 2003).

-the nature of *ex post* wage bargaining (threat point or outside offer), and promotion policies (up-or-stay versus up-or-out) affects investments in specific training (Oosterbeek, Sloof and Sonnemans 2007a, b).

Principal-Agent Interactions: What have we learned in the lab?

‘Personnel economics’ in 1994:

“There is a large and growing interest in the economic theory of the internal workings of firms. However, this literature is based on **very little data** and **limited stylized facts.**”
Baker, Gibbs and Holmstrom 1994a.

“For a time there was considerable excitement about implicit contract theory... That literature soon fell out of favor, but in its place came more refined information economic analyses that viewed wage contracts as optimal responses to asymmetries in information between employees and firms. With this, the logical possibilities for explaining wage behavior grew dramatically. Today's large variety of models and modeling options has put **theory well ahead of observation.**” Baker, Gibbs and Holmstrom 1994b.

“With the advent of information economics and contract theory, models of internal labor markets -or at least selected features of these markets-have begun to emerge. The objective of these theories is to show that internal-labor-market outcomes can be construed as second-best solutions to contracting problems under incomplete information. For instance... At this point, *there is hardly any feature of internal labor markets that cannot be given some logical explanation using the right combination of uncertainty, asymmetric information and opportunism.* (Baker and Holmstrom: Internal Labor Markets: **Too Many Theories, Too Few Facts**” 1995).

Personnel economics in 2009: Too many facts?

Perhaps, but we have learned that some of the models of 1994 perform well in the lab; others do not. While results do depend on specific implementations and parameterizations, we view this as significant progress.

For more on what we have learned, Gary will talk about:

-Social Preferences

-Discrimination