Chapter 20
Personnel Economics: Hiring and Incentives*

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February 17, 2020

Personnel economics studies the employment relationships. As labor market is getting more skilled and the HR strategies are getting more sophisticated, the opportunities of creating surplus through efficient matching of firms and employees has grown.

It differs from most other fields in labor economics since

- it grows largely in business schools: interested in how firms solve HR problems
- it is shared between labor economics and organizational economics: hoping to explain how firms make HR decisions.

It mainly focuses on

- how firms incentivize employees: successful (some unanswered questions are very difficult to answer)
- how firms establish, maintain, and end employment relationships: much to be done (main models treat firms as "black-boxes").

The authors suggest changing the focus from incentives to hiring not only because we know less but hiring also because it is as important as incentives.

1 Incentives

"Distributed benefits" and "Costs in the presence of asymmetric information"

- See Lazear and Oyer (2010) and Gibbons and Roberts (2010) for full discussion.
- Both theoretical and empirical studies on incentives are successful: advances in information economics complete the theoretical models and the models are confirmed empirically.

*Paul Oyer and Scott Schaefer (2011) in Handbook of Labor Economics, Volume 4b.

1.1 Do financial incentives change behaviors?

"To tie the agent's utility to the principal's benefit"

- Negative evidence: Ariely (2008), Freeman and Kleiner (2005)
- Positive evidence using controlled field experiments: changing from fixed pay to pay-for-performance (Lazear, 2000; Shearer, 2004).
- The answer depends on the definition of "work" (Besanko et al., 2009): measured performance is improved while important-but-hard-to-measure aspect may be ignored.

Broadly speaking, empirical evidence suggests that pay-for-performance incentives are associated with improvements in performance (See Bloom and Van Reenen, 2011 for detailed discussion).

1.2 How do firms provide incentives?

"Tying pay with specific performance measure/subjective assessment, promotions, access to future labor-market opportunities, etc"

1. Holmstrom (1979)
   - Risk-averse agent chooses a level of costly effort e; risk-averse principal observes output x, which is affected by e and a random state of nature.
   - The optimal sharing rule $s(x)$ can be characterized as

     $$\frac{G'(x-s(x))}{U'(s(x))} = \lambda + \mu \frac{f_e(x;e)}{f(x;e)},$$

     where λ is the Lagrange multiplier for the agent's participation constraint and μ is a multiplier for the incentive constraint.
   - Efficient risk-sharing requires the ratio of the principal (G) and the agent (U) marginal utilities to be equated across output levels.
   - "Informativeness Principle": any information which is incrementally informative about e should be used.
   - Firms commonly violate Informativeness Principle.
2. Holmstrom and Milgrom (1991)
   - Multi-tasks principle/agent problem: not only the overall level of effort but the allocation of effort across different tasks is important.
   - For task $i \in \{1, 2\}$, output x_i is

     $$x_i = e_i + \tilde{\epsilon_i},$$

where $\tilde{\epsilon_i}$ is a mean-zero, normal r.v.. If the pay is $\beta_1 x_1 + \beta_2 x_2$, then the f.o.c. are

$$\beta_1 = \frac{\partial c(e_1, e_2)}{\partial e_1}$$

$$\beta_2 = \frac{\partial c(e_1, e_2)}{\partial e_2}.$$

- Assuming $\frac{\partial^2 c(e_1,e_2)}{\partial e_2 \partial e_1} < 0$, higher $\beta_1 \rightarrow$ lower e_2; $\tilde{\epsilon_2}$ larger $\rightarrow$ higher β_1.
- Pay teachers by test scores?
  - shifts effort away from other aspects
  - Informativeness Principle need not apply when firms need to motivate the right kind of efforts.

3. Baker (1992): single-task model with randomness in measurement of performance

These models suggest two main costs of using pay-for-performance measure when the measure is imperfect: 1) shifts risk to agents and the firm must compensate for the risk and 2) leads agents to choose wrong actions. There is ample empirical evidence supporting this (Oyer, 1998; Larkin, 2007).

"Objective measures v.s. Subjective measures"

- the latter is non-verifiable and thus must be self-enforcing
- Bull (1987) and Baker et al. (1994a): a firm that pays a promised bonus today maintains the employee's trust and can make credible promises to pay bonuses based on subjective measures in the future

1.3 Unanswered questions

1. **Risk v.s. Incentive**

   - The tradeoff arises when

     (a) employees have convex disutilities in risk and effort

     (b) performance measures are subject to random variation;

     hence,

     - MB of incentives: efficiency in effort is increasing in incentives.
     - MC of incentives: increasing in employees' risk.
   - Greater risk should be associated with weaker pay-for-performance incentives; however, there is no strong support by empirical evidence (Prendergast, 1999 and 2002ab).
   - Measurement problems
     - measuring risk σ^2 (conditional variance of output measure V): unclear whether var(V) truely reflects it

- other parameters: marginal returns to effort, risk tolerance, responsiveness to incentives.

- The authors consider these measurement problems to be very tough and do not consider this as a fruitful area.

2. **CEO pay**

   - There is little conclusive evidence on whether CEO pay is structured correctly.
   - Measurement problems
     - Theory suggests CEO pay should depend on
       (a) the marginal return to marginal effort
       (b) the second derivative of the manager's cost-of-effort function
       (c) the manager's degree of risk aversion
       (d) the conditional variance of output
       (e) the manager's reservation utility
       (f) the firm's reservation profit level
       (g) the manager's bargaining power
     - None of these can be easily measured by empirical researchers.
   - Some features of this market make it difficult to control for these factors using manager or firm fixed effects:
     - one CEO at one time and the tenure is long
     - managers change jobs infrequently and not for exogenous reasons

2 Hiring

Efficiency is achieved when the labor market identifies the best match of workers to firms. The core problem in hiring is "Matching with search cost and asymmetric information": all relevant aspects of potential partners cannot be costlessly observed, and quality can be misrepresented.

2.1 Black-box models

"Black boxes": firms are homogeneous and maximize the difference between the work's productivity and his wage.

1. Matching

   - Jovanovic (1979b)
   - Good matches persist while bad matches end: the hazard rate of worker/firm separations decreases with job tenure.
   - Whether it is the result of matching or firm-specific human capital remains open (Jovanovic, 1979a).

2. Search cost

    - See Mortensen and Pissarides (1999) for detailed review.
    - Models are characterized by sequential sampling from a known wage distribution and optimal stopping rules.
    - Applications: job flows, unemployment, and equilibrium wage dispersion.

3. Asymmetric information

    - Spence (1973) signal model
    - Adverse selection: employers hiring in the pool of the unemployed will only hire at low wages (Greenwald, 1986).

2.2 Hiring strategies

The work to date does not provide a good picture of 1) whether firms spend resources on hiring and 2) which hiring investments are the most successful.

1. **Match-specific productivity**: What makes a worker the "right" worker?

    (a) Complementarity

    - Assortive matching in labor markets (Rosen, 1982; Sattinger, 1993)
    - Employee attribute and production technologies
        - skill-biased technological change: falling IT prices cause labor demand shift toward the skilled (Katz and Autor, 1999)
        - workplace reorganization is also complementary to skilled workers and IT investment (Ichniowski et al., 1997; Bresnahan et al., 2002)
        - high ability is more preferred than extensive labor-market experience at advanced technology firms (Abowd et al., 2007)
        - Andersson et al. (2009): firms in market segment with highly variable payoffs pay higher starting salaries

    (b) Weights on general skills

    - Lazear (2009)
        - all skills are general, but firms place different weights on various combination of skills
        - match-specific productivity (as in Jovanovic, 1979ab): suppose there are two dimensions of skills, A and B. For worker i with endowment (A_i, B_i) and firm j with skill-weight (α_j, β_j), the output is

        $$\alpha_j A_i + \beta_j B_i.$$

        The right worker for firm j is the one whose (A_i, B_i) matches with (α_j, β_j).

- some of the empirical predictions are yet to be examined
- Geel et al. (2009) empirically find greater skill-specifity is related to greater investment in training and lower mobility across occupations.

(c) Risky workers

- Lazear (1998)
  - potential workers not only vary in skills but also in the degree to which the firm is risky
  - firing costs, expected firm lifespan, and the degree of private information matter
- Some hypotheses are empirically tested
  - Burgess et al. (1998): firms in growing industries have higher churning flows
  - Oyer and Schaefer (2002): increase in termination cost leads shifts demand away from young workers
- The effect of uncertainty on hiring is examined in sports (Bollinger and Hotchkiss, 2003; Hendricks et al., 2003).

(d) Employee preferences/beliefs:

- Van den Steen (2005)
  - expected profits are higher when the firm hires a visionary manager.
  - firms with visionary managers will hire workers who agree with the manager's vision.
- Prendergast (2007)
  - incentives of bureaucrats should be provided through selecting the preferences of the bureaucrats.
  - some bureaucrats are biased toward their clients (teachers) while some are against (police).
  - selecting the employees to the bureaucracy is difficult when the potential employee preference are not publicly observed.
- Prendergast (2009)
  - inability to contract on output holds implication of the selection of workers.
  - consider a university hiring faculty and administration.

2. **Self-selection**: How to induce workers to reveal information prior to hiring decisions?

(a) Compensation policy

- Salop and Salop (1976) point out that compensation policy is one possible tool
- High productive workers expect to earn larger payments in pay-for-performance schemes (Lazear, 1986 and 2004).

- Raising wage offer can encourage best applicants to engage in costly signaling (Janssen, 2002).

(b) Others such as stock-based pay for lower-level workers (Oyer and Schaefer, 2005)

3. **Labor market intermediaries**: See Autor (2009) for detailed review

   (a) Temporary help firms (Autor, 2001a)
   - free training on general skills: induce worker self-selection and allow for private screening
   - firms are increasingly using temp agencies to identify candidates for permanent employment

   (b) Executive search firm
   - It accounts for a very small fraction of overall hiring: top positions at large firms
   - Bull et al. (1987)
     - search firms incur the same cost as employers in screening
     - advantages: 1) diversify sampling risk and 2) screening in advance and thus filling vacancies quicker
   - There is essentially no follow-on literature in economics (only little progress like Cappelli and Hamori, 2006) while there is some in management and sociology.

4. **Social network**: It matters but why?

   (a) Transmit of information
   - Bayer et al. (2008): a pair of individuals who live on the same block are a third more likely to work together than individuals who live close to each other but not on the same block.
   - See Ionnides and Loury (2004) for detailed discussion.

   (b) Assessment by employers
   - Roles of referees (Saloner, 1985)
     - firms maximize profits while referees care about both placement rates and quality of the employees
     - equilibrium features truth-telling and first-best hiring choices
   - Hiring social contacts of current workers (Montgomery, 1991)
   - Casella and Hanaki (2006, 2008)
     - models firms hiring through two sources: 1) network and 2) signal
     - when networking is free, networking is almost always preferred even certification is more informative
     - both networking and signaling are costly, workers compare the expected informational rent to up-front costs
   - Empirical literature in this area is still in its infancy

  - high-wage sectors tend to engage in more referral-based hiring
  - individuals hired through employee referral earn higher wages
  - Simon and Warner (1992), Kugler (2003), Mosca and Pastore (2009), Antoninis (2006), etc

5. **Employment-to-employment transition**:

   - Fairly common: 2.6% of employed persons change jobs each month (Fleischman, 2004).
   - Efficacy of this depends on two main factors:
     - is employee productivity firm-specific?
     - is the learning of employee productivity symmetric or asymmetric?
   - Symmetric v.s. asymmetric learning

     (a) Symmetric learning
       - Lazear (1986): it is the good workers that are raided since raids happen under two condition
         * the worker's productivity is higher at the raider than the incumbent
         * the worker's productivity at the raider is higher than his wage at the incumbent
       - Tranaes (2001)
         * modeling that firms endogenously choose where to hire
         * equilibrium features unemployment even for good workers: separation happens exogenously
         * social welfare is strictly improved if raids are prohibited: negative externality on unemployed job searchers

     (b) Asymmetric learning
       - Waldman (1984): incumbent preserves its informational advantages (tying wages to jobs but not productivity)and distorts job assignment
   - Empirical evidence supports both models in different contexts.
   - The authors think that this literature needs more industry studies
     - CEOs: 26.5% of newly appointed CEOs are hired from other companies (Murphy and Zabojnik, 2006)
     - Securities analysts: star analysts who change jobs show a long-lasting reduction in job performance (Groysberg et al., 2008)

6. **Employer research**: Less developed than employee search

   (a) Search
   - Two sources of search: 1) extensive and 2) intensive margin (Rees, 1966).
   - Firms spend more time on recruiting when training expenditure/education requirement/firm size is larger (Barron et al., 1985).

(b) Vacancies

- Approaches taken are from search theory.
- Empirical design: estimation of hazard rate of vacancy filling and factors that affect the hazard rate.

7. **Recruiting on the Internet**:

- See Autor (2001b) for discussions on early attempts.
  - reduction in search costs (+)
  - rise in adverse selection (−): signaling becomes less meaningful
- There is little work on this strand after 2001.
  - Search by workers: Kuhn and Skuterud (2004), Stevenson (2009), and Bagues and Labini (2009)
  - Recruiting by firms: Hadass (2004), Nakamura et al. (2009), Brencic and Norris (2009), Kuhn and Shen (2009)

8. **Organizational demography**:

- Race/ethnicity of hiring managers matter (Giuliano et al., 2009).
- Law firms are somewhat concentrated with respect to the law schools where they hire (Oyer and Schaefer, 2010).
- The driving sources are not clear: social networks or productivity effects.

9. **Agglomeration:**

- Large and concentrated labor market has
  - less search cost and better matches (+)
  - more competition and less monopsony power (−)
- Firms co-location: source of certain types of workers.
- Labor market thickness, firm location, and work/firm matching: Wheeler (2004), Andersson et al. (2007), Freedman (2009), Garicano and Hubbard (2007, 2009), etc.