Chapter 8 Advanced Job Design: Teams

Economics 136
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Note: You are responsible for the appendix

Key Questions

1. When should a firm set pay as function of team output?
2. How to overcome worker motivation problems in teams?
3. How to align incentives of workers with team goals?
4. Use of peer pressure and norms
5. How to structure teams to maximize profit?
6. How have improvements in information technology affected job design?

1. When should a firm set pay as function of team output?

- If cannot easily attribute earnings to individual workers in a team
- If 'whole is greater than sum of parts' because worker inputs complementary
- If individual workers can become more efficient by specializing
- If workers have much to teach each other through transfer of knowledge
  - Likely conditions: If workers differ in their knowledge
  - If the info one worker has is valuable to others

When should a firm NOT use worker teams?

- Main reason not to use teams: weakens incentive to work hard

- Reason: "Free rider problem": Worker gets only a small share of the revenues generated by an increase in his effort

- Free rider problems most likely if team is large, and if workers find it hard to monitor their colleagues' effort

- Imagine that output Q depends on effort of n workers and that workers share revenues equally.

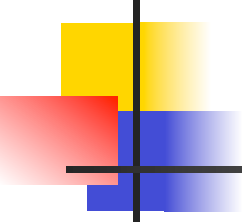# Worker exerts less than optimal effort if he shares revenues

- Worker 1 of n workers:
- $\max PQ(e_1,...,e_n)/n - c(e_1)$
- FOC: $(P/n)dQ/de_1 = c'(e_1)$
- This entails much less effort than if each worker were paid his actual VMP:
- FOC would be:

- Conversely, if worker paid on basis of own output, he might help team-mates less than optimal

Summary

- Using teams most useful if:
  - Workers are complements rather than substitutes
  - Free rider problems not major
    - Team is small
    - Easy for workers to monitor other's effort
  - Gains from specialization
  - Gains from knowledge transfer
- Examples: Teams would work well for small manufacturing company which has many specific tasks (sales, accounting, design and overseeing) and output of worker in a given job is observable (so no free riding)

2. How to overcome worker motivation problems in teams?

- Related question:
- 3. How to align incentives of workers with team goals?
- Similar answers to these questions.

- Two broad forms of incentives: explicit and implicit

Explicit incentives

- ## Bonuses for team
  - ### Share dollar bonus for meeting specific target
- ## Profit sharing
  - ### Not a good incentive unless small firm.
    - #### (Workers will feel their effort will be a "drop in the ocean"!)
- ## Stock and Stock Options

Implicit Incentives

- Studies suggest U.S. firms DO use implicit incentives for whole work force.
- Don't make pay explicitly a function of team performance, but if profits rise, give bigger pay raises.
- More expensive than stock options because such wage hikes usually go to all workers, not just senior management
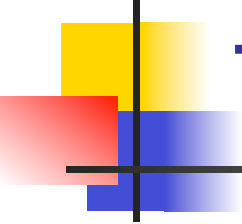
4. Use of peer pressure and norms

- Firm can establish "norms" of behavior that it expects of all workers.

- Not explicit rules, so workers can ignore norms. But if do, are punished by:
    - Lower wage hikes
    - Team bonus is taken away if anybody shirks. Creates peer pressure from other team members.
    - Criticism, shunning (ostracism) etc.
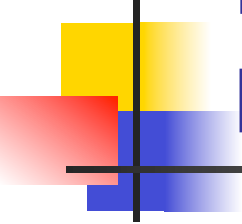
How to induce loyalty among team members?

- Need exercises to get workers to empathize with each other and the firm.
  - Outward Bound sorts of adventures

I'M SENDING ALL OF YOU TO THE "RIVERS AND TREES" MANAGEMENT COURSE.

THERE YOU'LL BE ASKED TO PERFORM A VARIETY OF DANGEROUS TASKS IN THE WOODS. YOUR SURVIVAL WILL DEPEND ON YOUR CREATIVITY AND ABILITY TO WORK TOGETHER.

OH, SO IT'S A TEAM-BUILDING EXERCISE.

I THINK OF IT MORE AS A HEADCOUNT REDUCTION THING.

How to induce loyalty among team members? (part 2)

- Other ways to create empathy:
  - Team meetings/quality circles
- If worker can empathize with team members, less likely to "steal" from them by goofing off.

Demonstration that as cost of deviating from norm rises, effort rises (Appendix pp. 227-228)

- Creation of group loyalty alters utility function so that if worker exerts effort E < E*, he feels guilty and loses utility. Let pay be Y(E):

- $U = Y(E) - C(E) - \Upsilon(E^*-E)$ where Y and C are utility from consumption and disutility from effort, $Y' > 0$, $Y'' \le 0$, $C' > 0$, $C'' > 0$.

Proof that dE/dϒ > 0

- Use implicit function theorem to solve for impact of ϒ on effort E.

- If dU/dE=Y'(E) − C'(E) + ϒ = 0 then by implicit function theorem,

- dE/dϒ= -(∂dU/dE/∂γ)/(∂dU/dE/∂E) =

5. How to structure teams to maximize profit?

- May want to rotate workers among tasks
  - 1) to learn where most productive and
  - 2) because of diminishing returns to info exchange among team members with time
- Give managers bonus if their workers later promoted to management and do well
  - Reduces risk that managers will have incentive not to promote best workers due to fear of competition from them

Problems between teams?

- Usually creating > 1 team leads to cooperation within teams and competition among teams
  - Put workers who need to cooperate on the same team
  - Encourage cooperation among related teams by pre-specifying that they must cooperate in order to earn full bonus

How to pick members for teams?

- If manager knows worker talents well, best for manager to do this

- But if workers know each other well, may be best for workers to sort themselves into teams.
  - Two methods:
    - Alternating draws (inefficient because team picking first through a coin toss may not be best place for their first pick)
    - Bidding for members
      - Alaska fishing example: best fishermen and fish spotters renegotiate and get larger share of the catch, or are hired away by other boats

Worker-owned firms: do they behave differently?

- Many examples e.g. United Airlines at one point

- Economic theory says these firms should act as π-maximizing firms. Do they behave differently?
  - Tend to lay off fewer workers in recession
  - Profits tend to grow more slowly than regular firms

- This is probably inefficient behavior: workers pay a price (through lost profits and wages) in return for greater job security.

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6. Information Technology (IT) and Decision Making

- Decentralizing?
  - facilitates product complexity, time-based competition, etc.
  - better collection and use of specific knowledge in real-time
  - lower-level employees have more info, better analysis tools
  - facilitates ad hoc communication and groups
- Centralizing?
  - fewer layers, geography less important
  - central monitoring and direction is easier
  - much knowledge becomes general, not specific
  - more can be standardized …

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IT and Job Design

- A Dismal View

  - "A new era of production has begun … brought about by the combination of the computer and the self-regulating machine.

  - "This results in a system of almost unlimited productive capacity which requires progressively less human labor."

  Ad Hoc Committee on the Triple Revolution, 1964

Examples

- Computers often replace humans
  - re-engineering
  - software that writes software
  - Computers/Internet facilitate offshoring and outsourcing
- Computers often make jobs less meaningful
  - "Big Brother" in the trucking industry
  - Mrs. Fields Cookies – who runs the store?
- End result: less empowered, less skilled workers
  - now let's think about the other face of IT …

A More Positive View of IT

- Jobs
  - IT often empowers even low skilled workers
  - places even greater value on skilled workers
- Firms
  - speeds up product cycles
  - facilitates customization and complexity
  - opens up new customers and products never before possible, or even conceivable

Example: Boeing Aircraft Development

1962: Boeing 727

- 131 passengers, 100,000 parts
- 81 month development
- 5,000 engineers

1. 1000s of pounds of blueprints, done by hand
2. Construct full-scale model
3. Set specifications for parts machining
4. Fix errors & imperfections with "shims" (0.5" tolerance)
   - ½ ton out of 44 tons = shims

1994: Boeing 777

- 305 passengers, »100,000 parts
- 52 month development
- many fewer engineers

1. CAD/CAM entire plane
2. Digital code for computer controlled machine tools

Results
- better quality, far fewer shims (0.023" tolerance)
- allows Boeing to offer customization
- facilitates outsourcing of parts
  - Italy, UK, Japan, etc.

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How to Explain the 2 Faces of IT?

- IT sometimes *substitutes* for, and sometimes is a *complement* to, humans
- What do computers do best, and what do humans do best?
  - Computers
    - information transmission
    - repetitive tasks
    - rules-based tasks
  - Humans
    - pattern recognition
    - abstraction / generalization
    - creativity

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Where's the Economic Value?

- Once something is made systematic …
  - it can be computerized or mechanized
  - it can be outsourced
  - it *will* be commoditized
- Most economic value arises from ***creation of new knowledge***
  - so, the implications for your firm, and your career, are obvious …

High Reliability Organizations

- Main points: organizations that occasionally must deal with crisis are centralized and develop "play books" that list what to do in common contingencies
    - See Appendix for military example
- Do a lot of training so that in times of crisis highly skilled team members can make decisions in a quick and decentralized way