Lecture 10: Multitasking

Compensation in Organizations

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Examples of Gaming

Paper	Setting	Gaming Described	Δ Worker+Firm Surplus?
Roy (1952)	US steelworkers	deliberate slacking	ambiguous
Oyer (1998)	US manufacturing	higher end of year sales	price decreases (weak $-$)
Larkin (2014)	software salespeople	higher last day sales	price decreases (weak $-$)
Courty and Marschke (2004)	federal bureaucrats	graduation date of trained workers	earnings reductions ($-$)
Alexander (2020)	doctors in New Jersey	sorting patients	ambiguous

Discussion: Dinerstein and Opper (2025) (Still working paper)

Gaming vs. Multitasking

- I view gaming as manipulating the rules, typically via timing, to improve payouts.
  - Example: Closing a deal early to increase commission.
  - Example: Grading more leniently on a standardized test that is used for benchmarking.
  - Example: Working very hard for the first 4 hours of a shift and relaxing for the remaining 4.
- Multitasking involves choosing how much effort to spend on different tasks.
  - Example: Seeing more patients for less time vs. fewer patients for more time.
  - Example: Teaching more tested material at the expense of untested material.
  - Example: Producing more oil now rather than shutting down for maintenance.
- There are many situations that are both gaming and multitasking.
  - Example: Spending time opening fake bank accounts s opposed to real accounts at Wells Fargo.

Examples of Multitasking

Paper	Setting	Performance Pay Change	Multitasking Impact?
Dumont et. al. (2008)	doctors in Quebec	less	$\uparrow$ teaching and time per service, $\downarrow$ volume
Tayan (Pop. Press 2019)	Wells Fargo bankers	more?	$\uparrow$ fake accounts
Alexander (2020)	doctors in New Jersey	more	no impact
Gong et. al (2021)	doctors in China	more	$\uparrow$ intensity, $\downarrow$ inpatient stays
Dinerstein and Opper (2023)	teachers in NYC	more	$\uparrow$ tests scores, $\downarrow$ grades & attendance

Dumont et. al. (2008)

Table 6
Impact of mixed compensation on practice variables, pediatrics and general surgery

	Fixed effects OLS			Pooled Tobit					
	Volume / year	Income / year	Hours / week	Clinical hours/ week			Non-Clinical hours/ week			Research hours/ week
				Tot.	Hosp.	Priv. Cl.	Tot.	Admin.	Teach.	
PEDIATRICS (Control group: pediatricians paid only under the FFS scheme after reform)										
Treatment effect	-12.99***	15.83***	-1.87*	-2.88**	0.34	-3.46*	3.92***	3.27*	0.48	-9.56**
St. Error	3.72	6.62	1.12	1.14	1.33	1.83	1.40	1.85	1.19	4.03
Effect of the reform	-12.99***	15.83***	-1.87*	-2.88**	0.49	-2.92**	1.56*	0.48	0.61	-2.01*
St. Error	3.72	6.62	1.12	1.14	1.20	1.48	0.80	0.68	0.56	1.06
% effect of the reform	-12.81	8.69	-3.75	-6.55	2.20	-15.88	27.89	25.14	13.88	-38.20
Log likelihood	-	-	-	-	-3 423	-3 757	-2 678	-2 078	-1 653	-1 147
Hausman test[a]	53.86	37.68	41.10	44.97	-	-	-	-	-	-
Test of parallel trend[b]	0.92	0.48	0.28	1.22	2.27	7.60	9.03	2.55	7.99	9.05
GENERAL SURGERY (Control group: general surgeons paid only under the FFS scheme after reform)										
Treatment effect	-15.32***	18.37***	-2.70	-1.83	0.04	-4.68**	0.62	0.27	0.53	-1.36
St. Error	3.81	4.28	2.48	2.37	2.54	2.00	1.27	1.64	1.04	1.59
Effect of the reform	-15.32***	18.38***	-2.70	-1.83	0.06	-1.02	0.07	-0.83	0.38	-1.07
St. Error	3.81	4.38	2.48	2.37	2.52	0.83	0.95	0.75	0.66	0.77
% effect of the reform	-10.72	8.14	-4.81	-3.77	0.14	-31.47	0.81	-23.05	8.37	-21.53
Log likelihood	-	-	-	-	-4 509	-3 014	-3 093	-2 459	-1 916	-1 235
Hausman test[a]	39.41	8.07	169.10	26.50	-	-	-	-	-	-
Test of parallel trend[b]	1.46	0.98	1.13	0.71	4.81	0.96	1.19	2.08	2.49	2.08

Significance levels:*10%;**5%;***1%.

Discussion: Tayan (2019)

(Note: popular press article not peer reviewed research)

The One Task Assumption

- So far we have assumed that there is a single, productive task.
- This captures many jobs and environments well.
- The trade-off is between exerting effort and not exerting effort.
- But some jobs have more than one type of productive effort.
  - Question: Can you give examples?
- Some jobs have destructive tasks!
  - Question: Can you give examples?

The Multitasking Model: Dropping Uncertainty

- We want to capture a new force (multiple tasks)
- To keep things simple, we drop noise/luck/uncertainty (ϵ)
- We no longer need to think about certainty equivalents, variances, etc.
- We also will assume an outside option of 0 for the worker.

The Multitasking Model: Adding Multiple Tasks

- The worker will have two tasks, numbered 1 and 2.
- The cost of exerting effort e_1 at task 1 and e_2 will be $c(e_1, e_2)$
- We will assume this function is increasing in each argument, but not much else.
- Output is given by $y = ae_1 + be_2$, where a, b can be positive or negative.
- We can only pay based on some measurement of effort: $m(e_1, e_2)$

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Model

- Output is $y = ae_1 + be_2, a > 0, b > 0$
- Cost of effort is:

$$c(e_1, e_2) = \begin{cases} 0 & \text{if } e_1 + e_2 \leq 2\bar{e} \\ (e_1 + e_2 - 2\bar{e})^2/2 & \text{if } e_1 + e_2 \geq 2\bar{e} \end{cases}$$

- Only task 1 effort is measured: $m = e_1$
- Only what is measured is rewarded: $w(m) = \alpha + \beta m = \alpha + \beta e_1$
- Assume that without incentives (if $\beta = 0$) the worker supplies all "free effort" (total effort up to $2\bar{e}$) and splits total effort evenly across the two tasks:

$$e_1 = e_2 = \bar{e}$$

First-Best Solution

See the board!

Equilibrium Solution (What Actually Happens)

See the board!

Equilibrium Solution (What Actually Happens)

Theorem 1

The firm uses high-powered incentives ($\beta^* = a$) and the worker focuses entirely on task 1 ($e_1^* = a + 2\bar{e}, e_2^* = 0$) if:

$$a \geq 2\bar{e}\frac{b-a}{a}$$

Otherwise the firm uses a flat salary ($\beta^* = 0$) and total effort is low and evenly split ($e_1^* = e_2^* = \bar{e}$)

Deepwater Horizon

- Cost reductions were rewarded (e_1).
- But improving "safety" or "latent risk" was not.
- Part of this is not nefarious: cost reductions are easy to measure.
- Avoided disasters are impossible to measure!
- In some instances incentives are worse than no incentives!

Counterterrorism at the FBI

- The FBI was created to fight traditional crime, like murders.
- Traditional crime is easy to measure:
  - How many suspects did you bring in?
  - How much evidence did you collect?
  - Was there a conviction?

Counterterrorism at the FBI

- During the 1990s, the FBI tried to also handle domestic terrorism.
- But how do you measure this?
- Terrorism is rare.
- Successful counterterrorism prevents things from happening.

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Recall: Dinerstein and Opper (2025) (Still working paper)

Discussion: Lavy (2009)