

# Lecture 10: Multitasking

## Compensation in Organizations

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February 18, 2026

Discussion: Alexander (2020)

## Examples of Gaming

Paper	Setting	Gaming Described	$\Delta$ 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

## 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	↑ teaching and time per service, ↓ volume
Tayan (Pop. Press 2019)	Wells Fargo bankers	more?	↑ fake accounts
Alexander (2020)	doctors in New Jersey	more	no impact
Gong et. al (2021)	doctors in China	more	↑ intensity, ↓ inpatient stays
Dinerstein and Oppen (2023)	teachers in NYC	more	↑ tests scores, ↓ grades & attendance

Discussion: Dumont et. al. (2008)

**Table 6**

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

<b>PEDIATRICS (Control group: pediatricians paid only under the FFS scheme after reform)</b>										
	<b>Fixed effects OLS</b>				<b>Pooled Tobit</b>					
	Volume	Income	Hours	Clinical hours/ week			Non-Clinical hours/ week			Research
	/ year	/ year	/ week	Tot.	Hosp.	Priv. Cl.	Tot.	Admin.	Teach.	hours/ week
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 <sup>a</sup>	53.86	37.68	41.10	44.97	-	-	-	-	-	-
Test of parallel trend <sup>b</sup>	0.92	0.48	0.28	1.22	2.27	7.60	9.03	2.55	7.99	9.05
<b>GENERAL SURGERY (Control group: general surgeons paid only under the FFS scheme after reform)</b>										
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 <sup>a</sup>	39.41	8.07	169.10	26.50	-	-	-	-	-	-
Test of parallel trend <sup>b</sup>	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%.

# 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 ( $\epsilon$ )
- ▶ 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  $e_1$  units of effort on task 1 and  $e_2$  units of effort on task 2 is given by  $c(e_1, e_2)$ .
- ▶ 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 Oppen (2025) (Still working paper)

Discussion: Lavy (2009)