The Science of Japanese Personnel Management
- Rethinking employment systems in the era of globalization

Handout

Edward P. LAZEAR

Jack Steele Parker Professor of Human Resources Management
and Economics, Stanford University /
former Chairman of the U.S. Council of Economic Advisors

July 12, 2013

A Personnel Economics Approach to Productivity Enhancement

Edward P. Lazear

Stanford University

Themes

- Productivity is enhanced through
  - incentives
  - worker sorting
  - supervision
- Training and leadership

What is personnel economics and what is its relevance to productivity?

- Application of formal economics, mathematics, and statistics to human resources issues
- Goal is positive and normative

The Use of Compensation to Increase Productivity

- Large effects on productivity
- Money isn't everything: "Psychic" rewards count
  - Everything has a monetary equivalent
  - Compensation consulting firms estimate tradeoffs

Two Types of Incentive Pay

- Payment on levels of output or input
  - Used where measurable
  - Less skilled
    - Agriculture
    - Basic services (Safelite)
    - Simple manufacture (clothing)
  - Most skilled: CEOs paid on stock performance
- Payment based on relative performance
  - Promotion hierarchies
 - Bonuses based on rank

Output-based Pay: Piece Rates

- Use when output observable
  - Both quality and quantity observable
- Creates
  - Incentives
  - Sorting
  - Appropriate when worker heterogeneity

Piece Rates and Performance: Safelite

- Productivity effects are very large (over 40% increase)
- Half from incentives (more effort), half from sorting (better workers)

Safelite

$\$$

W —

A

B

e_0 $e*$

q

Output

8
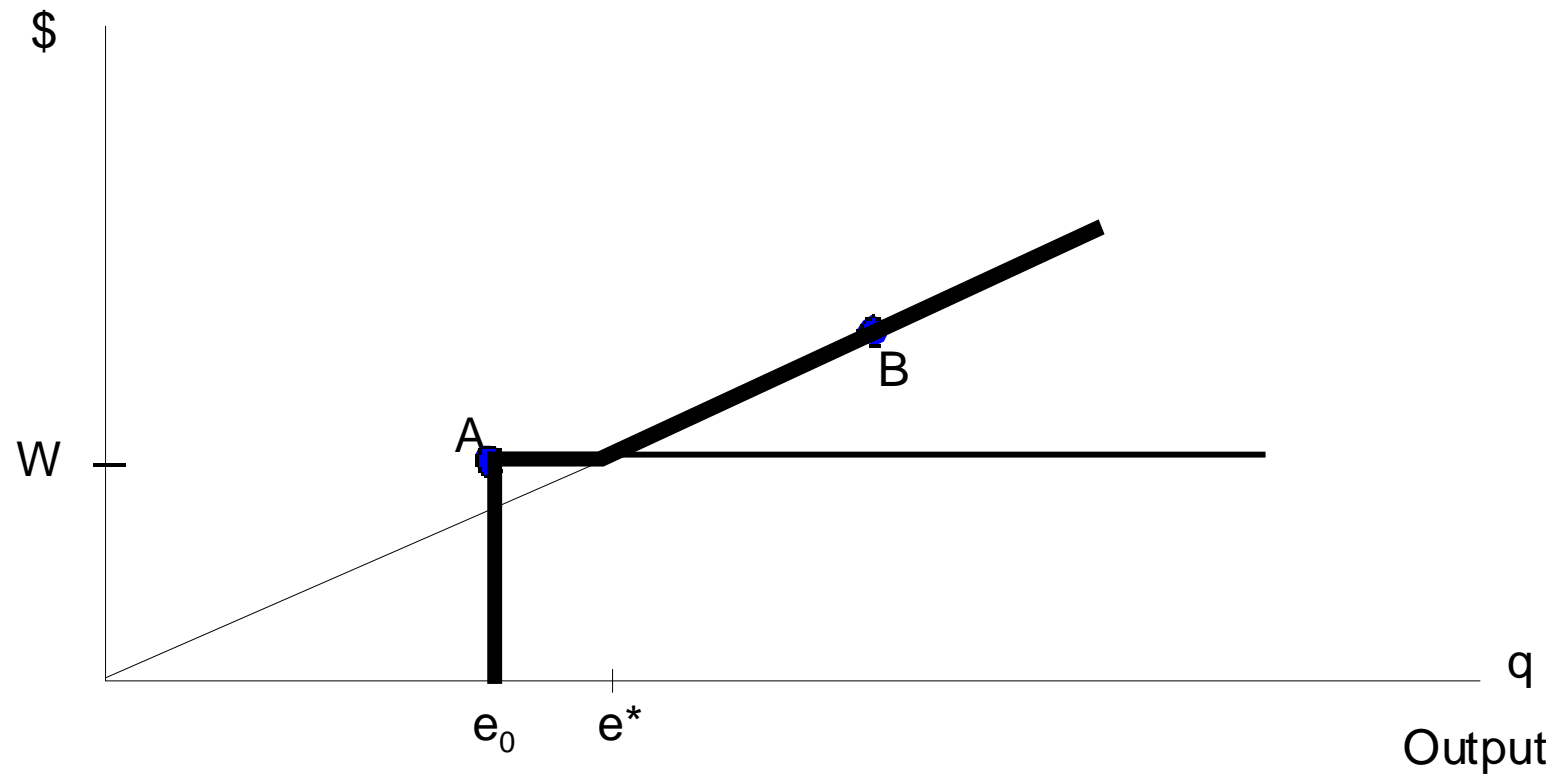
Safelite Results

	Hourly Wages		Piece rates	
	Mean	Standard Deviation	Mean	Standard Deviation
Number of observations	13106		15246	
Units-per-worker-per day	**2.7**	1.42	**3.24**	1.59
Actual Pay	$2,228	$794	$2,283	$950
PPP pay	$1,587	$823	$1,852	$997
Cost-per-unit	$44.43	$75.55	$35.24	$49.00

Regression Results:
Dependent variable: Units/worker/day

Reg. #	Coeff. on PPPFLAG	Coeff. on TENUR	Coeff. on PPP-TENUR	Coeff. on New Regime	r-sqr.	Description
1	**.369 (.013)**				.04	Dummies for month and year included
2	**.197 (.009)**				.73	Dummies for month and year; worker specific dummies included (3181 individual workers)
3	.313 (.014)	.343 (.017)	.107 (.024)		.05	Dummies for month and year included.
4	.309 (.014)	.424 (.015)	.130 (.024)	**.243 (.025)**	.06	Dummies for month and year included

Productivity Enhancement at Country Level

- Incentive effects relevant at country level
- Sorting
  - Most applicable for firms
  - Some applicability at country level to get workers in right jobs, occupations
    - Pay compression dampens incentives to sort appropriately (e.g., teachers)
    - Performance pay induces self-sorting

Incentives Based on Rank Order

- Almost all judgments are relative
- Firms use relative comparisons to motivate workers because rank is easier to judge than output
- A properly structure worker "tournament" provides good incentives and raises productivity

Tournament Theory

- Three points
  - Prizes are set in advance and determined by relative performance
  - The larger the spread, the larger the effort
  - The spread can be too great
- Pay affects those striving to obtain the job
  - Professional partnerships
  - Corporate hierarchies
  - Academia
  - Politics

Almost all evidence confirms existence and power of tournaments

- In sports (golf, horseracing)
- In experiments (laboratory and field)
  - Subjects behave as formal models predict
  - Women respond differently than men
- In business
  - Chicken farmers
  - Executive compensation in Danish Firms - tests
    - Spread and noise
    - Lower average pay in compressed wage structures
  - Raises and hours worked
  - Teamwork and wage structure
- Implications: Salary compression and taxes can harm productivity

Importance of Supervision:
Study of Large Technology-Based Service Provider

- A large fraction of advanced economies
  Examples:
      insurance-claims processing, computer-based test grading, technical call
      centers, in-house IT specialists, technical repair workers, some retail sales,
      airline gate agents, telemarketers

- The variance in boss effects is large
  –Difference between lowest and highest decile boss equals one worker in nine member team
  –Variance in boss effect on worker output larger than variance in worker effects themselves

- Average boss increases output by 1¾ times as much as average worker
  (commensurate with pay differences)

- Good bosses are much more likely to retain their workers
  –one standard deviation better boss results in 12% less worker turnover

- Because some public-good aspect of supervision, better bosses should have larger
 team

Regressions of Output-per-Hour on Boss Effects

Standard Deviation of Boss Effects	**4.74**
Standard Deviation of Worker Effects	**1.33**
Number of Observations	5,729,508
Number of Workers	23,878
Number of Bosses	1,940
Average Output per hour	10.26
Average Team Size	9.04

Creating Good Bosses, Leaders and Innovators

- General skills are key: Weakest link idea
- For leaders, problems come from many directions

Entrepreneurs Are Those with Balanced Skills
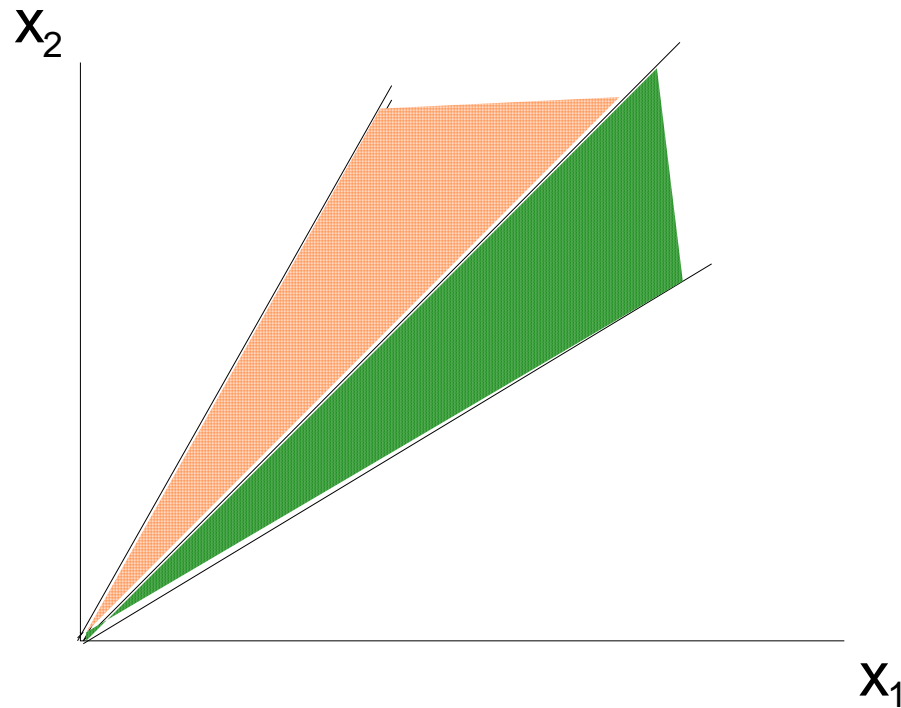
Entrepreneurship & Leadership
Evidence

- From Stanford MBA graduates
- Different roles are key
  - Less than 3, 3% chance of being entrepreneur; more than 15, 30% chance of being entrepreneur and c-level
  - General curriculum (no strong specialty) at Stanford ➔ more likely to be entrepreneur and c-level
  - Certain specialized curricula result in high pay

Job Histories

- Panel data Stanford graduates

- For each respondent, have job history

Probability of Entrepreneurship by Number of Prior Roles Held

Roles		
≤3	3 to 16	more than 16
.03	.10	.29

MBA Curriculum and Entrepreneurship

Variable	1 Logit	2 Tobit
EXP	.0259 (.0185)	.0266 (.0196)
SPECDIF	-.1458 (.0581)	-.1452 (.0592)
MALE	.6025 (.1511)	.6305 (.1531)
MBAYear	-.0318 (.0215)	-.0384 (.0224)
AGE	.0250 (.0179)	.0264 (.1531)
Log likelihood	-841	-1181
Number of obs.	1952	1950

Courses of Study, Income and Leadership

	1 C-Level Clustered Logit	4 Log of Income Clustered Regression
NPRIOR	.141 (.034)	-024 (.012)
EXP	.070 (.027)	.068 (.009)
MBAYEAR	-.030 (.024)	.020 (.005)
MALE	1.18 (0.21)	.245 (.031)
SPECDIF	**-125** **(.085)**	**-.003** **(.016)**
ECONOMICS	**.147** **(.073)**	**-.008** **(.015)**
FINANCE	**-.103** **(.058)**	**.096** **(.011)**
GPA		.141 (.035)
CONSTANT	-1.74 (2.34)	1.72 (0.50)
LOG LIKELIHOOD or R-square	-951	.13
OBSERVATIONS	4884	4241 (1738)

Entrepreneurship Rates and Aging
(from Liang and Wang)
(Entrepreneurial rate = fraction of population involved in start-up over past two years)
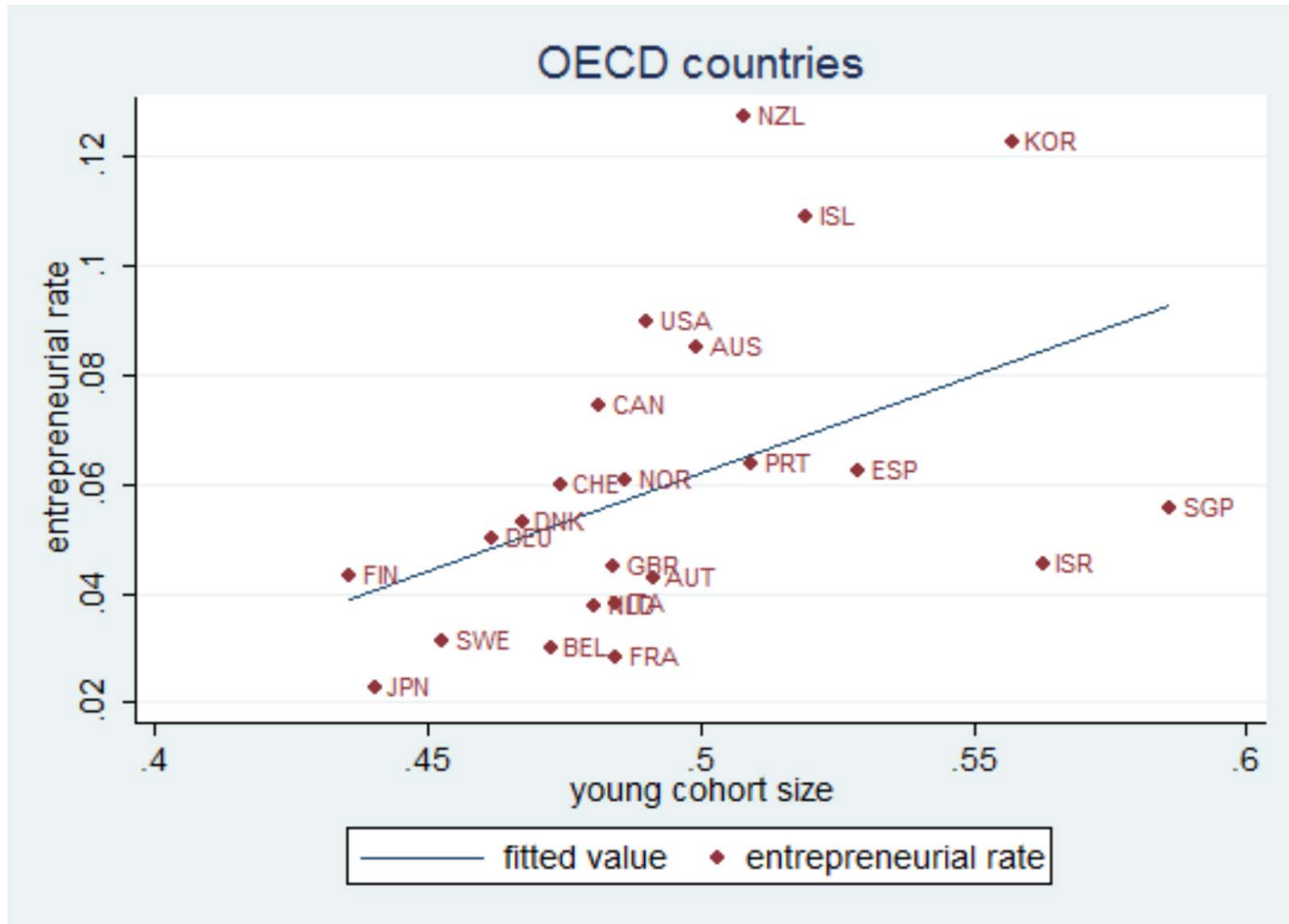
Entrepreneurship and GDP Growth
(from Liang and Wang)

Table 11: Dep var: adjusted GDP growth rate

	(1) OECD	(2) OECD VC	(3) G6	(4) G6+BRIC	(5) All
lentr	0.00675*				0.00616
	(0.00359)				(0.00376)
lvcpgdp		0.00329*			
		(0.00170)			
avems			0.0396**	0.0810**	
			(0.0131)	(0.0221)	
Constant	0.0294**	0.0358**	-0.00482	-0.0152	0.0372**
	(0.0106)	(0.0137)	(0.00577)	(0.0130)	(0.00995)
Observations	24	23	6	10	55

Standard errors in parentheses

Note: Adjusted GDP growth rate is the GDP growth rate from year 2000 to year 2009 adjusted by the growth of labor force

lentr is log entrepreneurship rate from the survey data

lvcpgdp is the log venture capital investment as a % of GDP

avems is the average market share of indigenous internet companies

* $p < 0.10$, ** $p < 0.05$

24

Conclusion

- Whenever studied, personnel practices have large effects on productivity

- These include

  - Compensation

    - Pay by absolute performance
    - Pay by relative performance

  - Human resources practices (teams, information, authority)

  - Supervision

  - General training