A Personnel Economics Approach to Strategic Human Capital Management: Insights from the Centers for Disease Control and Prevention

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Disclaimer

The findings in this presentation are the views of the authors and should not be interpreted to imply CDC policy or determination.

Integrating Personnel Economics to Inform Human Capital Management at CDC

Personnel Economics:

- A subfield of labor economics that drills inside the firm to study human resource management practices like compensation, hiring practices, training and teamwork (Lazear & Shaw, 2007)

Objective of Current Study:

- Gain insight on how the agency might be managing careers by specifically examining the return on education and return on tenure (or, experience)

Data

- Extracted from personnel records of white-collared federal civilian workers employed at CDC during 1995, 2000, and 2005
  - General Schedule (GS)
  - GS-equivalent (GM)
  - Senior Biomedical Research Service (RS)
  - Senior Executive Service (SES) and
  - Administratively Determined (AD) positions

- Excludes:
  - Wage Grade (WG) employees (1-3% of civilian employees)
  - Commissioned Corps Officers (10% of CDC employees), as they are governed by a different compensation, benefit and merit system

Methods

- **Multivariate regression analysis:**
  - Estimate log-linear earnings equation
  - Dependent Variable: log(salary), in 2005 dollars
- **Independent variables:**
  - Continuous variables: age, age-sq, years of govt experience (yos), yos-sq
  - Dummy variables: race, sex, education, supervisory status, disability status, veteran status, and location of employment

Returns to Education by Occupational Category: Marginal Effects

	1995	2000	2005
Occupational Category: All			
Masters Degree (*Reference*: BA or less)	9.9%	13.0%	14.6%
Doctoral Degree (*Reference*: BA or less)	18.2%	24.6%	21.2%
MD (*Reference*: Not an MD)	26.1%	31.3%	22.1%
Occupational Category: Professional			
Masters Degree (*Reference*: BA or less)	8.3%	8.2%	8.4%
Doctoral Degree (*Reference*: BA or less)	16.7%	22.1%	17.4%
MD (*Reference*: Not an MD)	24.6%	31.6%	22.8%
Occupational Category: Administrative			
Masters Degree (*Reference*: BA or less)	8.4%	12.7%	15.7%
Doctoral Degree (*Reference*: BA or less)	23.5%	21.0%	20.5%

Statistics are % increase in salary due to education estimated from the semi-log regression.

Regression adjusts for: age, age-sq, race, sex, years of govt service (yos), yos-sq, supervisory status, veteran status, disability status and location of employment.

All reported coefficients were significant at the 1% level or better.

Returns to Education by Occupational Category: Adjusted Salary

	1995		2000		2005	
	Not Adjusted	Adjusted*	Not Adjusted	Adjusted*	Not Adjusted	Adjusted*
Education Level: All						
Professional	$80,311	$71,818	$74,958	$80,057	$97,060	$90,087
Administrative	$68,927	$69,058	$70,933	$79,337	$85,335	$87,600
Education Level: Masters Degree						
Professional	$78,248	$69,754	$73,037	$80,797	$92,047	$86,379
Administrative	$75,100	$73,094	$77,074	$80,902	$93,542	$89,356
Education Level: Doctoral Degree						
Professional	$90,676	$79,835	$83,233	$83,841	$106,867	$95,480
Administrative	$86,872	$75,786	$89,028	$98,847	$103,309	$97,746

Adjusted statistics are mean predicted salary (in 2005 dollars) from the semi-log regression, where earnings were retransformed using the Duan's smearing estimator.

Regression adjusts for: age, age-sq, race, sex, years of govt service (yos), yos-sq, supervisory status, veteran status, disability status and location of employment.

Returns to Experience by Occupational Category: Marginal Effects

	1995	2000	2005
Occupational Category: All			
Gov Service: ≤ 5y	*Reference*	*Reference*	*Reference*
Gov Service: 6-15y	6.0%	9.2%	9.7%
Gov Service: >15y	14.2%	16.3%	14.7%
Occupational Category: Professional			
Gov Service: ≤ 5y	*Reference*	*Reference*	*Reference*
Gov Service: 6-15y	2.2%	8.2%	10.4%
Gov Service: >15y	7.5%	9.9%	12.9%
Occupational Category: Administrative			
Gov Service: ≤ 5y	*Reference*	*Reference*	*Reference*
Gov Service: 6-15y	6.4%	5.4%	6.3%
Gov Service: >15y	15.7%	16.1%	12.8%

Statistics are % increase in salary from education estimated from the semi-log regression.

Regression adjusts for: age, age-sq, race, sex, education, supervisory status, veteran status, disability status and location of employment.

All reported coefficients were significant at the 1% level or better.

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Returns to Experience by Occupational Category: Adjusted Salary

Education Level: Masters Degree

	1995		2000		2005	
	Unadjusted	Adjusted*	Unadjusted	Adjusted*	Unadjusted	Adjusted*
Yrs of Govt Service: ≤ 5y						
Professional	$69,998	$61,570	$64,930	$62,184	$76,847	$76,496
Administrative	$61,269	$60,310	$60,380	$59,593	$80,999	$78,009
Yrs of Govt Service: 6–15y						
Professional	$76,644	$70,718	$82,189	$74,574	$97,618	$89,494
Administrative	$70,604	$70,634	$77,524	$75,085	$95,124	$91,222
Yrs of Govt Service: >15y						
Professional	$88,802	$78,771	$90,982	$81,833	$109,316	$99,107
Administrative	$91,873	$87,311	$90,608	$87,297	$105,488	$100,213

Adjusted statistics are mean predicted salary (in 2005 dollars) from the semi-log regression, where log earnings were retransformed to natural units using the Duan's smearing estimator.

Regression adjusts for: age, age-sq, race, sex, supervisory status, veteran status, disability status and location of employment.

Returns to Experience by Occupational Category: Adjusted Salary, 2005

Education Level: Doctoral Degree

	1995		2000		2005	
	Not Adjusted	Adjusted*	Not Adjusted	Adjusted*	Not Adjusted	Adjusted*
Yrs of Govt Service: ≤ 5y						
Professional	$78,982	$72,345	$80,670	$70,641	$88,431	$84,781
Administrative	$71,140	$66,920	$76,332	$74,979	$94,923	$90,404
Yrs of Govt Service: 6–15y						
Professional	$90,669	$82,111	$96,681	$83,671	$110,931	$98,933
Administrative	$91,408	$80,313	$103,582	$89,232	$100,594	$101,956
Yrs of Govt Service: >15y						
Professional	$106,821	$92,547	$109,777	$92,527	$128,125	$108,860
Administrative	$103,667	$84,170	$99,169	$96,568	$115,930	$106,536

Adjusted statistics are mean predicted salary (in 2005 dollars) from the semi-log earnings regression, where log earnings were retransformed to natural units using the Duan's smearing estimator.

Regression adjusts for: age, age-sq, race, sex, supervisory status, veteran status, disability status and location of employment.

Conclusions

- Significant return on education and experience across all occupational categories;

- Returns vary across occupational categories:
  - Return on advanced education (MA or PhD) is higher among "administrative" versus "professional" employees, controlling for all other relevant factors;
  - Return on experience in mid-career (compared to those in early career) has been increasing for "professional" employees but has remained unchanged for "administrative" employees.

Conclusions (cont.)

- Adjusted predicted salary are generally higher among employees in the administrative versus professional category with similar levels of education and experience, upon controlling for all other relevant factors

  – Implies relatively flatter careers among employees holding advanced degrees in professional categories compared to similar employees in administrative categories.

Future Research

Study Limitations

- Data reporting errors
- Cross-sectional study: cannot make causal inferences

Future/Ongoing Research

- Develop a longitudinal employee database from 1995-2005 to conduct studies to:
  - investigate career dynamics as well as stability of employee career paths
  - identify factors that induce long-term worker-organization attachments
  - examine return on tenure and versus return on performance
  - assess effectiveness of workforce incentives in shaping retention & retirement

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