

Swiss Leading House

Economics of Education • Firm Behaviour • Training Policies

Skill obsolescence , Vintage Effects and Changing Tasks

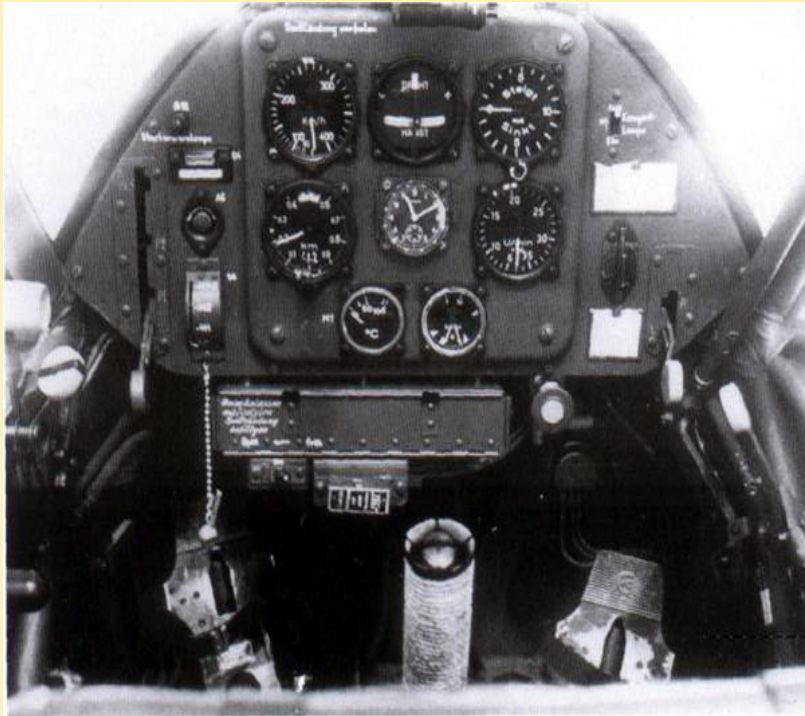
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Motivation:



Fieseler Fi 156



Airbus A380

Motivation:

•Do skills become obsolete as time goes by?

- *Arrazola, M. / de Hevia, J. (2004): "More on the Estimation of the Human Capital Depreciation Rate," Applied Economics Letters 11, 145-148.*
- *Neuman, S. / Weiss, A. (1995): "On the Effects of Schooling Vintage on Experience-Earnings Profiles: Theory and Evidence," European Economic Review 39(5), 943-955.*
- *Weiss, Y. / Lillard, L. (1978): "Experience, Vintage, and Time Effects in the Growth of Earnings of American Scientists, 1960-1970," Journal of Political Economy 86(3), 427-447.*

Motivation:



Motivation:

- **Skill obsolescence should differ between occupations according to the occupation's working tasks.**
- Experience earnings profiles as a function of task composition in different occupations.
- Knowledge bases tasks
- Experience based tasks

Data:

- BiBB/IAB Strukturerhebung: 1979, 1985/86, 1991/92, 1998/99
- 30000 observations each wave
- Detailed questions on work tasks.
- Detailed information about individual's occupation.

Data: Tasks Categories → Example 1979

Experience based tasks

Advertising, PR-Work, Publicizing
Buying, Selling Properties

Parenting, Training, Teaching; Consulting/Counseling

Negotiating, Representing someone's interests

Publishing, journalistically/literarily working

Organizing, planning, managing
Calling for customers, Visiting firms/companies

Renting, Brokering Objects

Auctioning Objects
Serving, Accommodating

Negotiating with customers/suppliers, Advising customers

Knowledge based tasks

Researching, analyzing, exploring
Projecting, planning, making plans

applying and using the law/rights

programming

repairing machines, equipment, vehicles and constructions

making constructions, sketching, modeling
chemically-physically analyzing and examining

Medically-biologically analyzing and cytologically examining

Shorthand, ciphering, coding
Reporting, drawing up the balance sheet

Making/Interpreting statistics

evaluating data processing

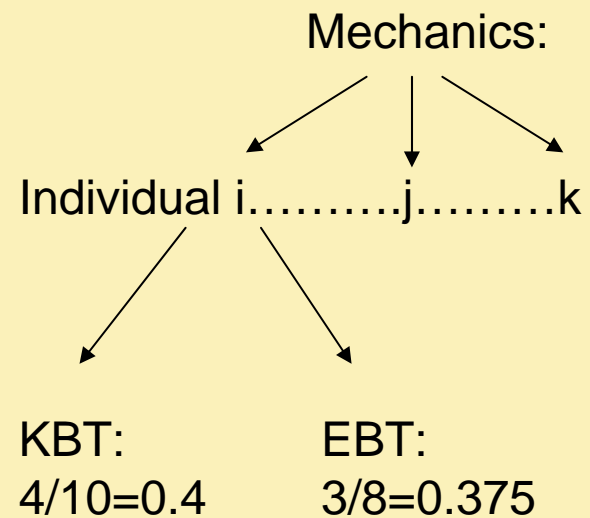
working out laws/regulations

Examining, appraising, estimating

Using, equipping, and maintaining a computer, software,
terminals and monitors

Data:

- 83 job categories → teachers, electricians, cleaners....



→ $E(\text{KBT})=0.24$ and $E(\text{EBT})=0.09$

Estimation Strategy: The Mincer Model

$$\ln E_j = E_0 + \sum_{t=0}^{j-1} (r_t k_t^* - \delta_t)$$

$$\delta_{j-1} = (1 + r_{j-1})k_{j-1}^* - k_j^*$$

$$\delta(kbt, ebt)$$

$$\left. \frac{\partial \delta}{\partial kbt} \right|_{ebt} > 0 \quad \left. \frac{\partial \delta}{\partial ebt} \right|_{kbt} < 0$$

Estimation Strategy: The Mincer Model

$$\ln y_i = \beta_0 + \beta_1 \text{exp}_i + \beta_2 \text{exp}_i^2 + \beta_3 \text{kbt}_{ij} + \beta_4 \text{kbt}_{ij} * \text{exp}_i + \beta_5 \text{ebt}_{ij} + \beta_6 \text{ebt}_{ij} * \text{exp}_i + X_i \beta_7 + \varepsilon_i$$

$$\text{exp}_i = f(\beta_1, \beta_2, \beta_4, \beta_6) = \frac{-(\beta_1 + \beta_4 \text{kbt} + \beta_6 \text{ebt})}{2\beta_2}$$

β_4 negative

β_6 positive

Results: Share of Tasks performed in each Category. (Pooled over all waves).

professional status	Education		Gender				
	<i>kbt</i>	<i>ebt</i>	<i>Kbt</i>	<i>ebt</i>			
unskilled	10.260	3.866	low education	9.313 6.624	female	10.963	18.984
blue collar	18.923	7.022	medium education	16.938 16.916	male	19.099	16.048
white collar	23.427	19.940	high education	25.632 33.993			
civil servant	16.598	25.592					

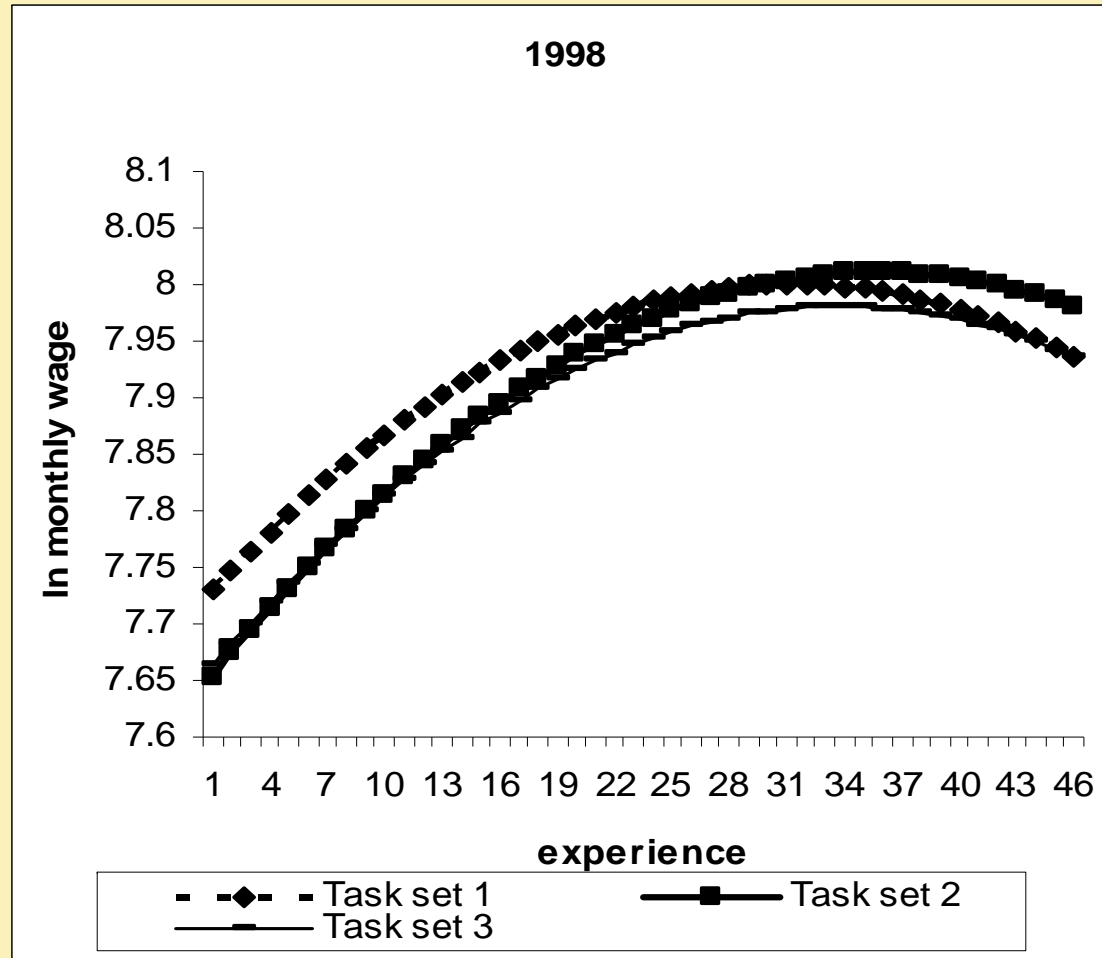
Results: Mincer Regressions

	1979		1985/86		1991/92		1998/99		Pooled	
	I	II	III	IV	V	VI	VII	VIII	IX	X
experience	0.034***	0.024***	0.032***	0.025***	0.027***	0.021***	0.023***	0.020***	0.029***	0.022***
	[28.81]	[23.04]	[31.84]	[26.82]	[23.78]	[19.95]	[17.24]	[16.21]	[53.42]	[43.92]
(experience squared)*100	-0.06***	-0.045***	-0.062***	-0.052***	-0.047***	-0.038***	-0.031***	-0.03***	-0.051***	-0.041***
	[29.18]	[24.68]	[29.68]	[27.71]	[21.81]	[19.68]	[13.38]	[14.17]	[48.60]	[43.48]
<i>Kbt</i>	0.017***	0.006***	0.017***	0.006***	0.019***	0.008***	0.018***	0.009***	0.018***	0.007***
	[25.45]	[9.77]	[26.50]	[9.88]	[27.83]	[12.63]	[23.73]	[12.19]	[52.02]	[22.41]
<i>kbt*exp*100</i>	-0.019***	-0.015***	-0.013***	-0.001	-0.019***	-0.01***	-0.018***	-0.011***	-0.016***	-0.008***
	[5.77]	[5.05]	[4.26]	[0.52]	[6.66]	[3.98]	[5.40]	[3.48]	[10.57]	[5.67]
<i>Ebt</i>	0.007***	0.001**	0.007***	0.001***	0.006***	0.002***	0.006***	0.002**	0.006***	0.002***
	[12.17]	[2.45]	[14.83]	[2.80]	[11.80]	[3.84]	[9.65]	[2.52]	[24.73]	[6.13]
<i>ebt*exp*100</i>	0.007**	0.013***	0.012***	0.015***	0.013***	0.015***	0.004	0.008***	0.009***	0.012***
	[2.44]	[5.68]	[5.29]	[6.95]	[5.40]	[5.73]	[1.49]	[3.46]	[7.53]	[11.21]
Controls	no	yes	no	yes	no	yes	no	yes	no	yes
Observations	15278	15278	15330	15330	13808	13808	11871	11871	56287	56287
R-squared	0.19	0.4	0.27	0.45	0.25	0.44	0.2	0.38	0.46	0.59

Robust t statistics in brackets * significant at 10%; ** significant at 5%; *** significant at 1%

Controls are sex, firm size, type of education, professional status and year dummies for IX and X.

Results: Graphics



Conclusion:

- Earnings profiles differ depending on different sets of tasks.
- Correlations indicate that skill obsolescence is stronger for individuals performing *knowledge based tasks* than for workers performing *experience based tasks*.
- Individual decisions of human capital investments.
- Hiring strategies of different jobs.