Life cycle wages

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Introduction

The material is draws from the following survey:

- Rubinstein, Y., & Weiss, Y. (2006). Post schooling wage growth: Investment, search and learning. In E. Hanushek & F. Welch (Eds.), *Handbook of the economics of education* (Vol. 1, p. 1 - 67). Elsevier.

Basic Facts

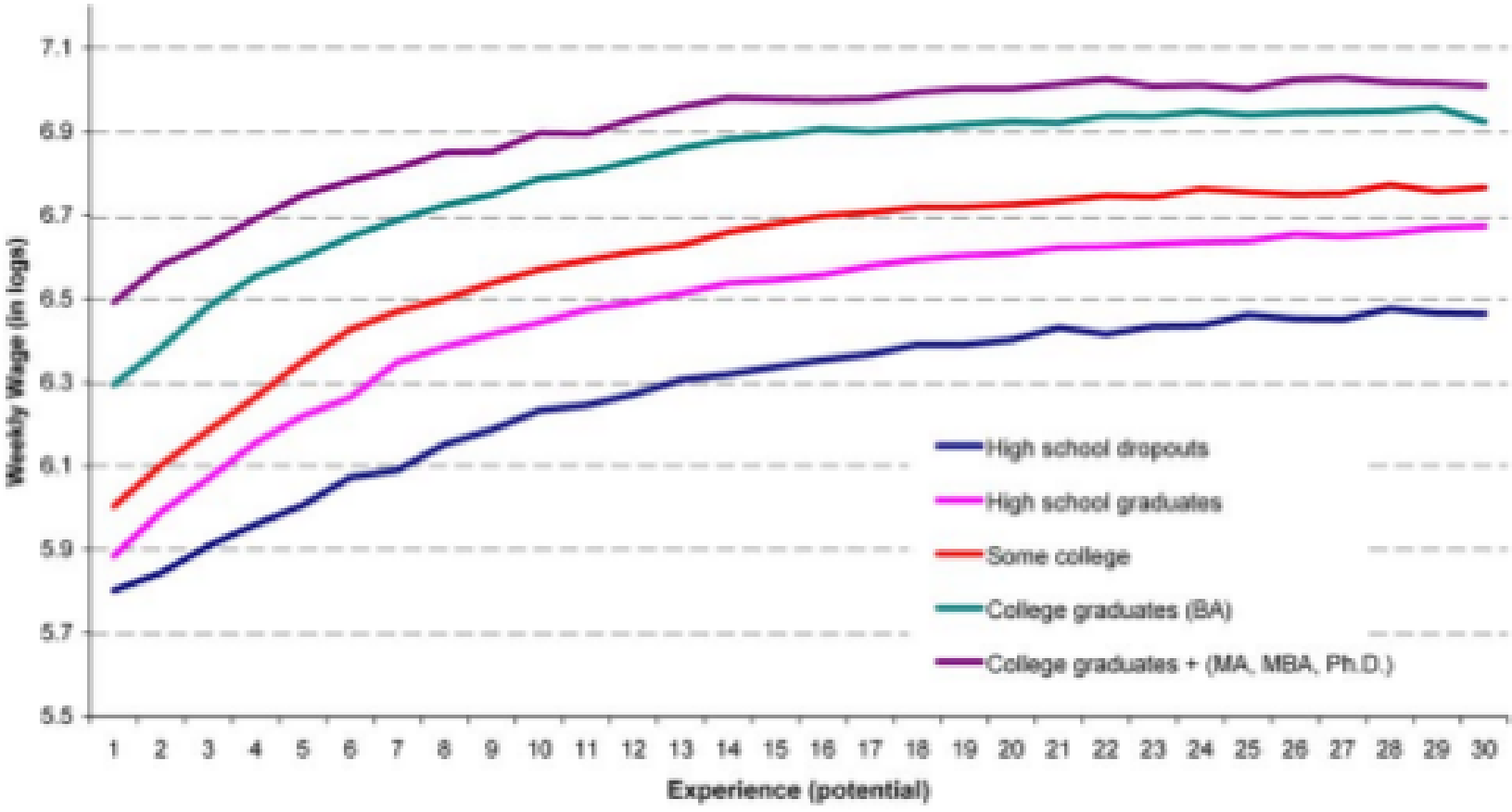

Figure 1. Mean weekly wages (in logs) by education and (potential) experience, white males, full-time full-year workers (52 weeks), CPS, March supplements, 1964–2002.

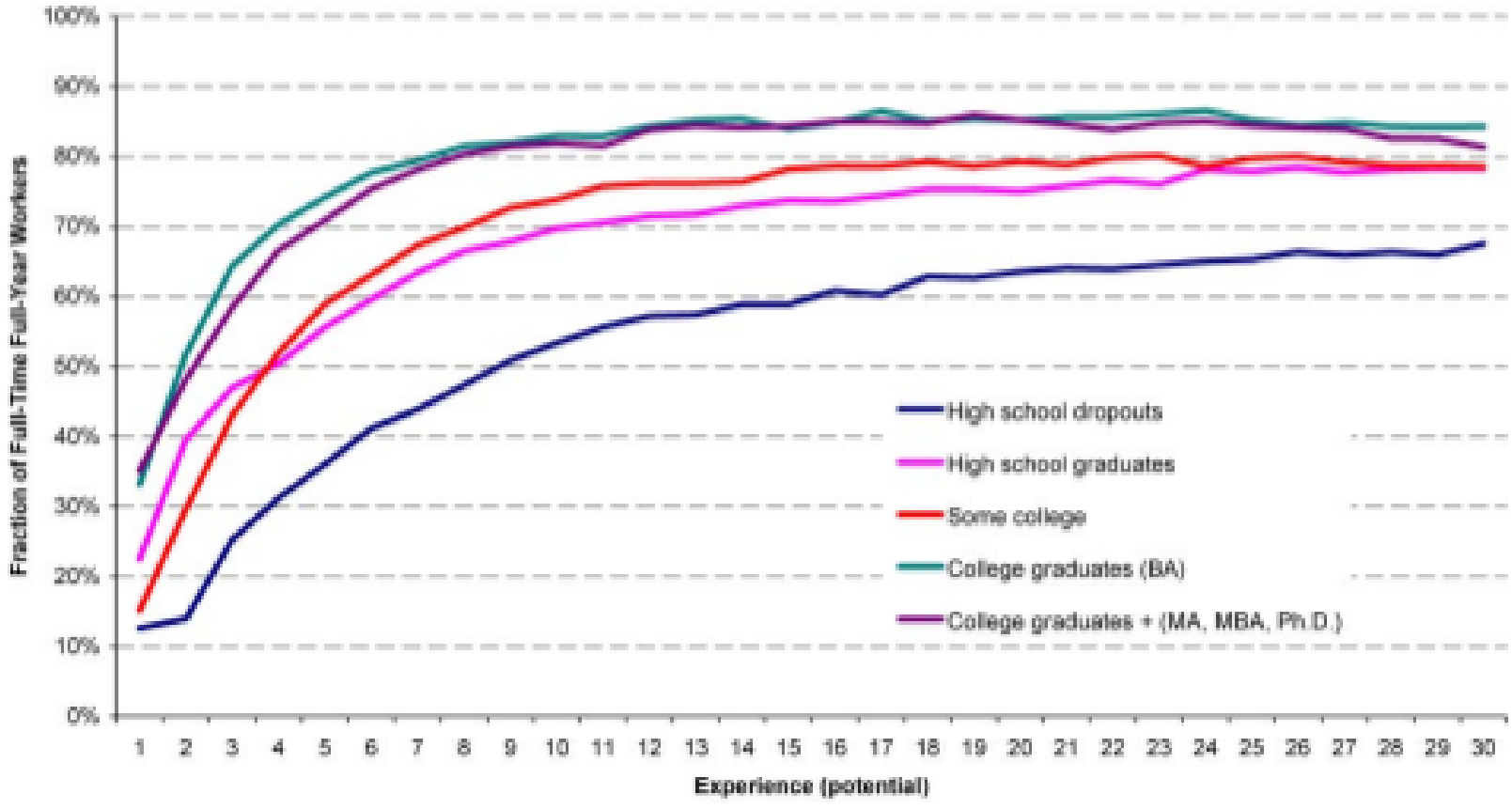

Figure 2a. Fraction of full-time full-year workers and average weekly hours of employed workers by education and experience, CPS, March supplements, 1964–2002.
Fraction of full-time full-year workers.

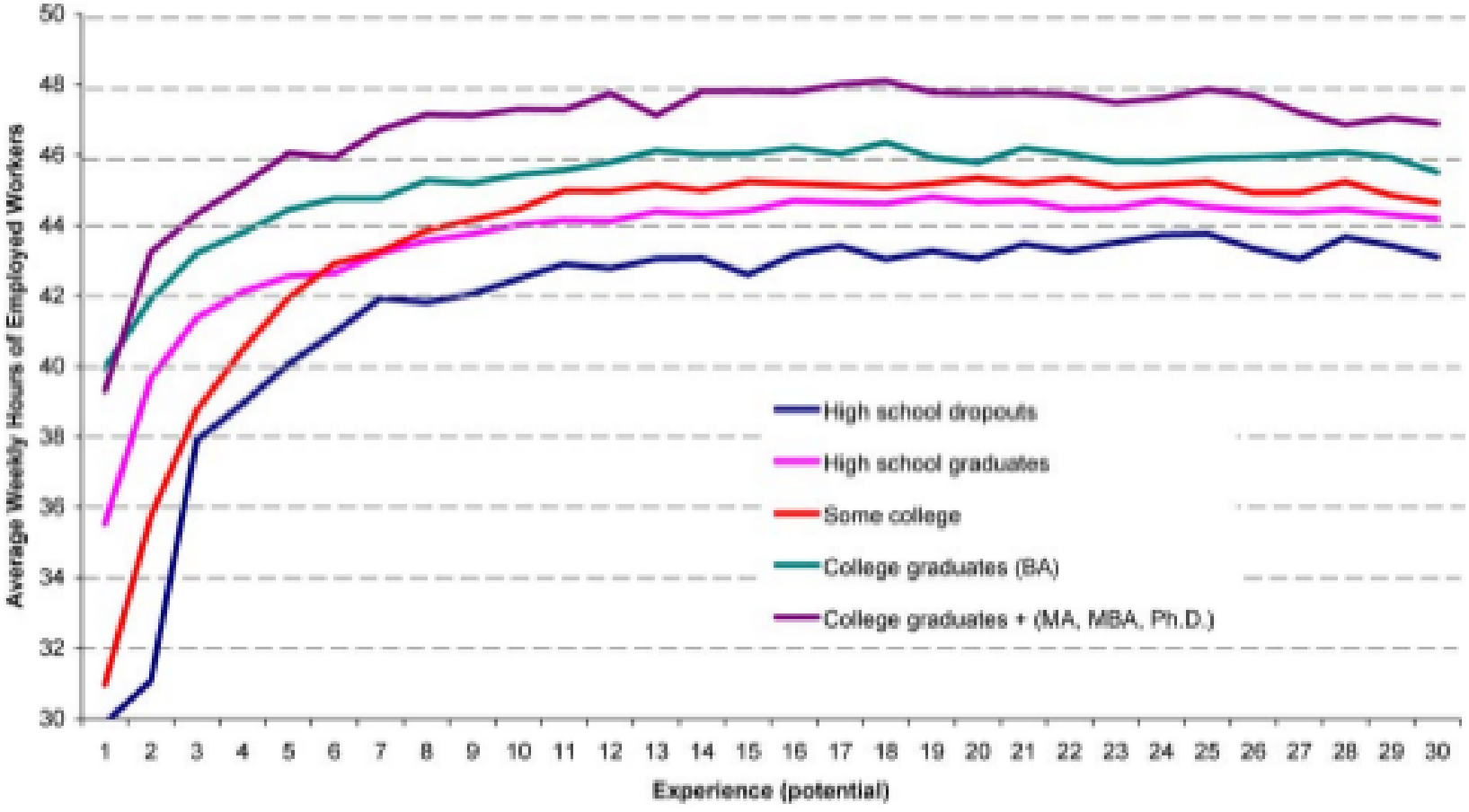

Figure 2b. Fraction of full-time full-year workers and average weekly hours of employed workers by education and experience, CPS, March supplements, 1964–2002.
Average weekly hours of employed workers.

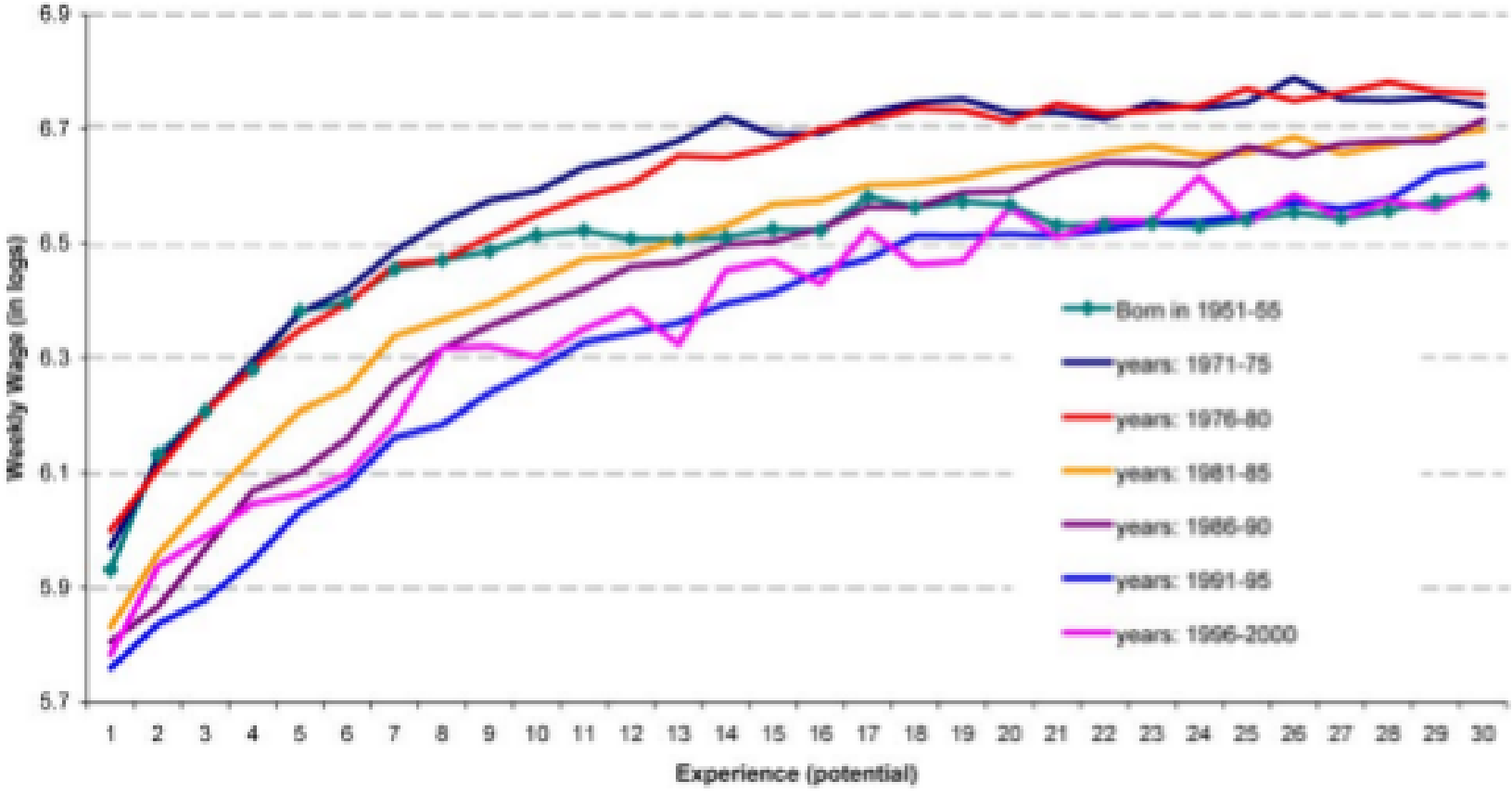

Figure 3a. Cohort and cross-section wage profiles for high school graduates and college graduates, white males, CPS, March supplements, 1964–2002.
High school graduates.

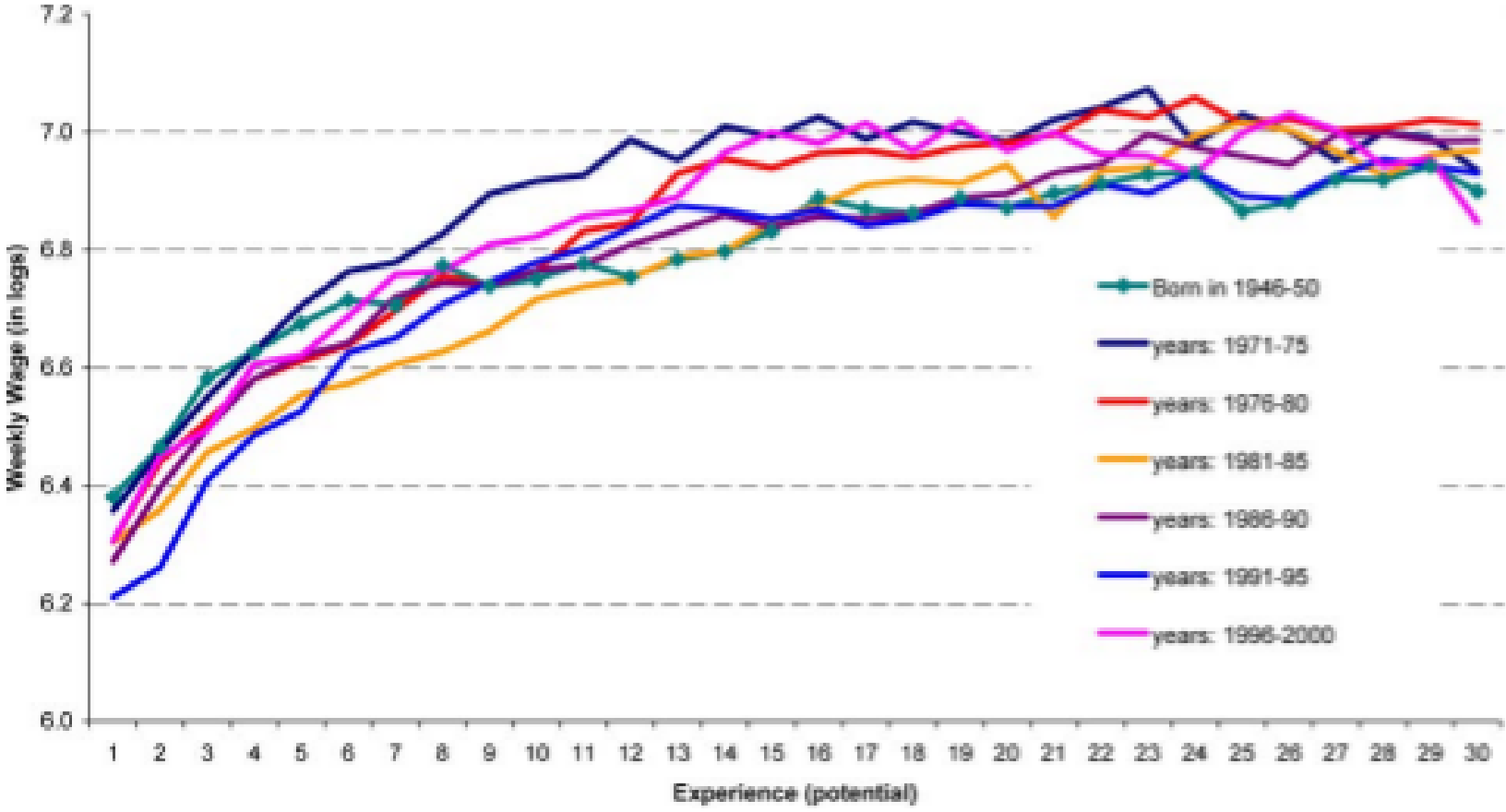

Figure 3b. Cohort and cross-section wage profiles for high school graduates and college graduates, white males, CPS, March supplements, 1964–2002.
College graduates.

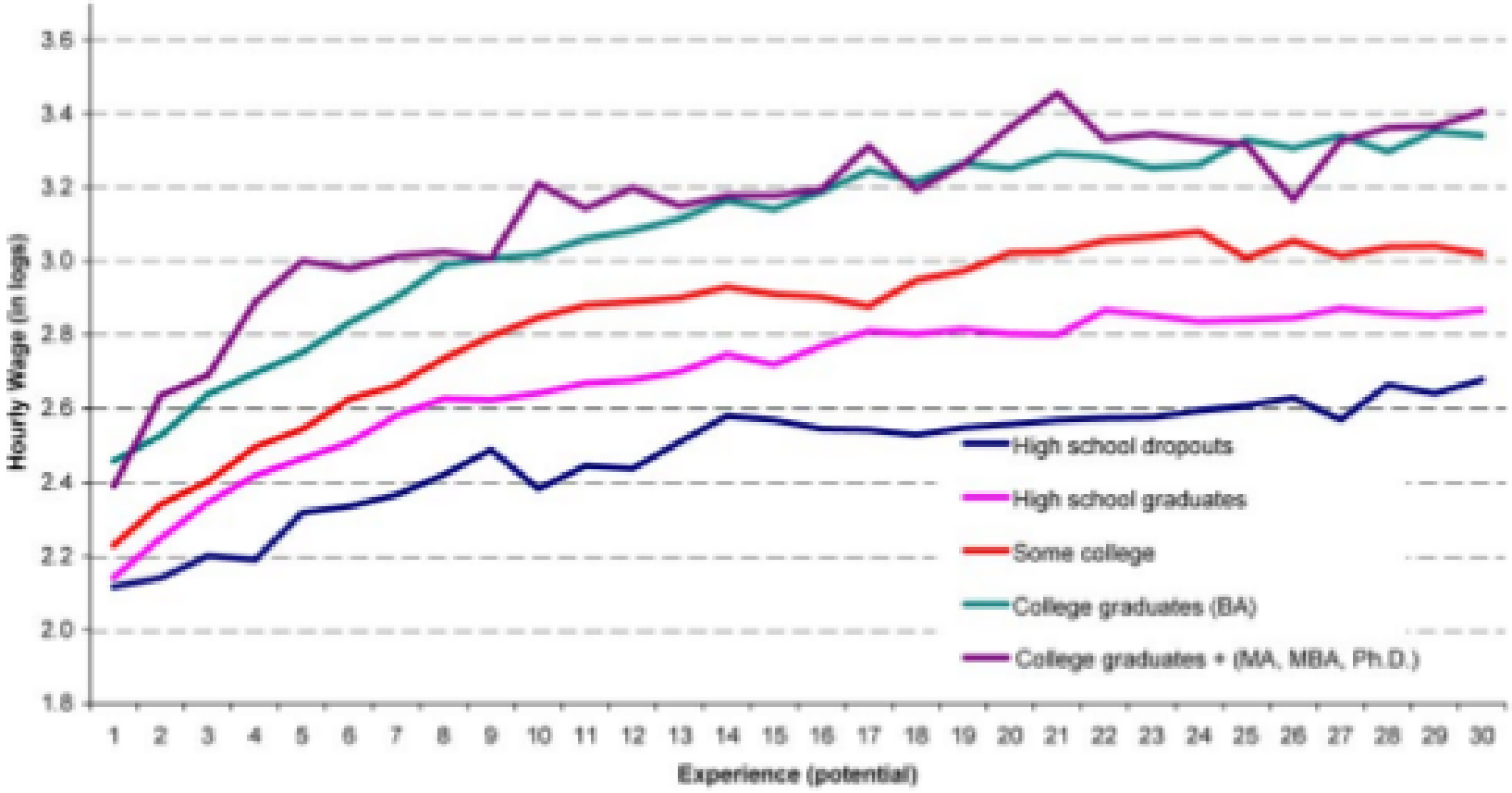

Figure 4a. Mean hourly wages (in logs) by education and experience, PSID, 1968–1997 and NLSY, 1979–2000.
PSID, 1968–1997.

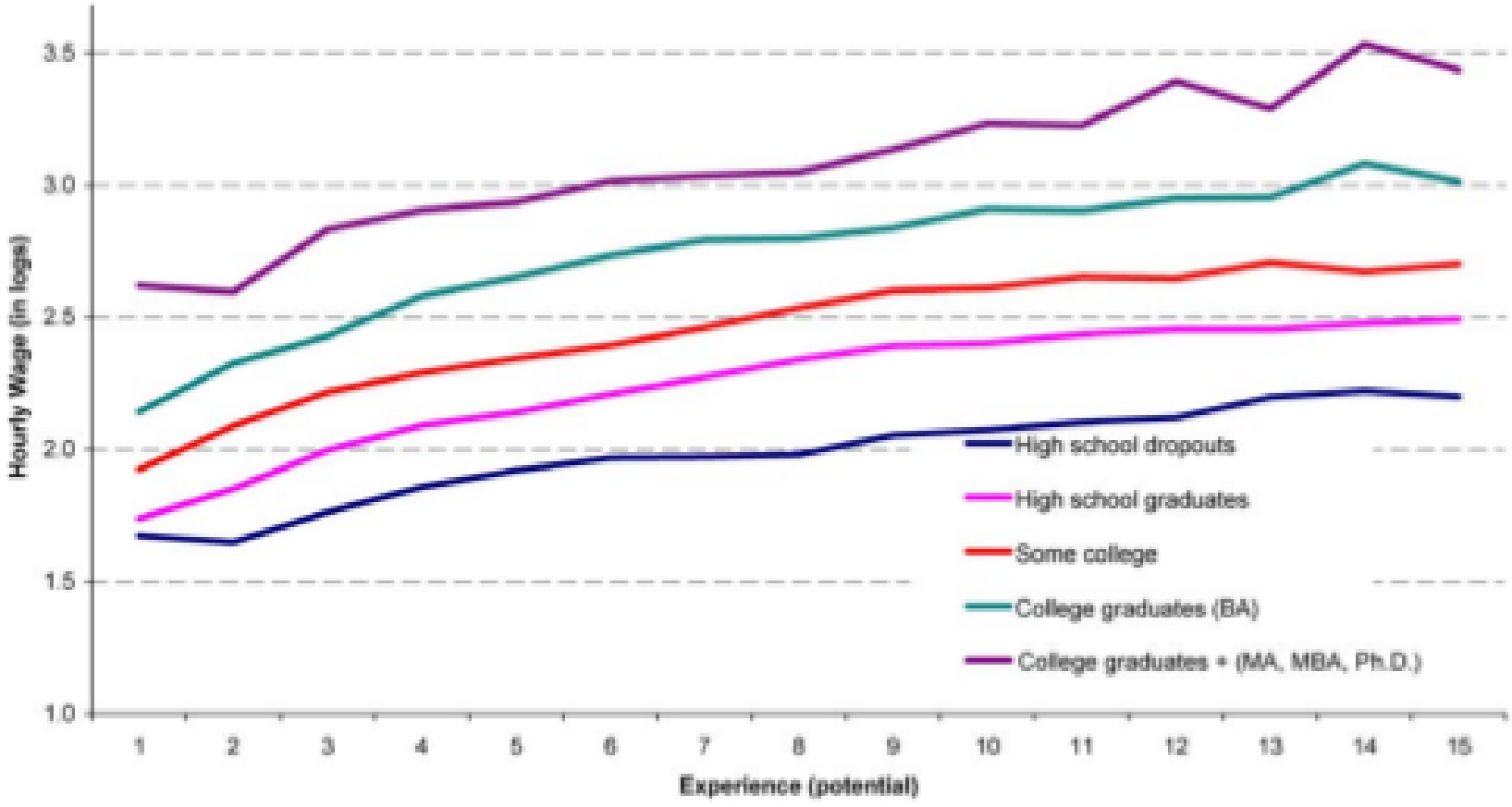

Figure 4b. Mean hourly wages (in logs) by education and experience, PSID, 1968–1997 and NLSY, 1979–2000.

NLSY, 1979–2000.

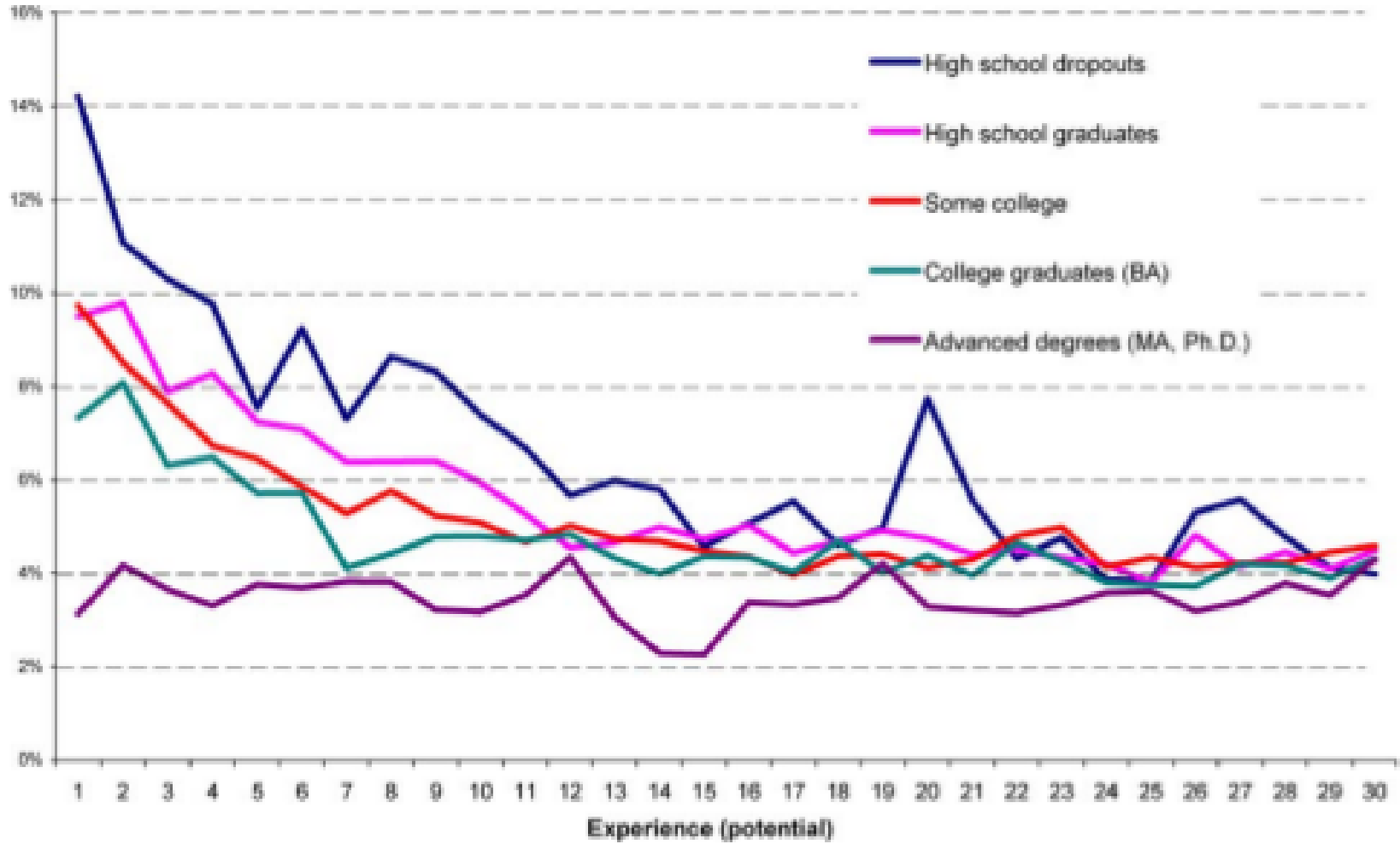

Figure 5a. Proportion of workers who changed occupation, industry or employers by education and experience, full-time workers, CPS-ORG, 1998–2002, and NLSY, 1979–2000.
Proportion of workers who changed occupation (within one month), CPS-ORG, 1998–2002.

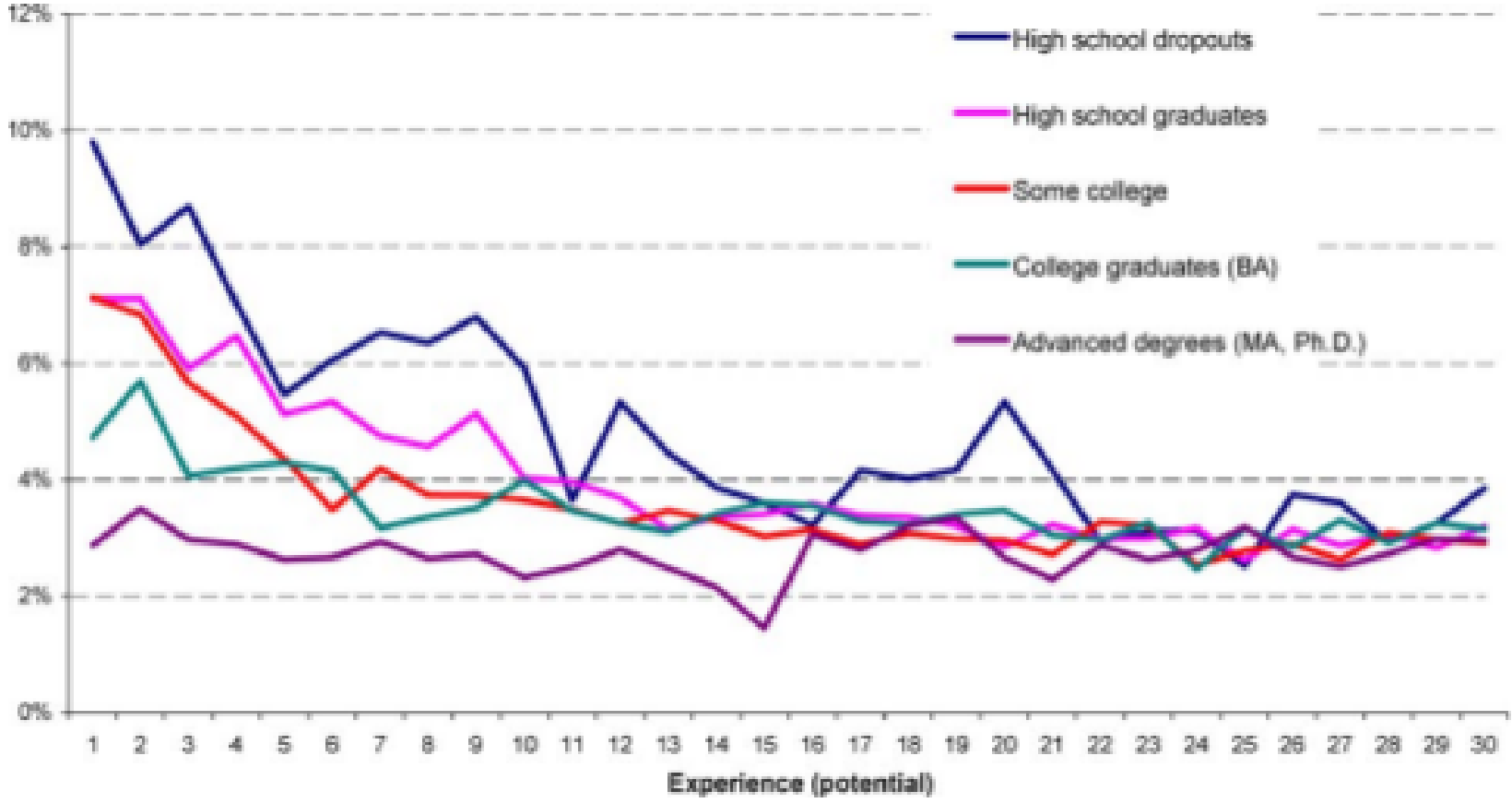

Figure 5b. Proportion of workers who changed occupation, industry or employers by education and experience, full-time workers, CPS-ORG, 1998–2002, and NLSY, 1979–2000.
Proportion of workers who changed industry (within one month), CPS-ORG, 1998–2002.

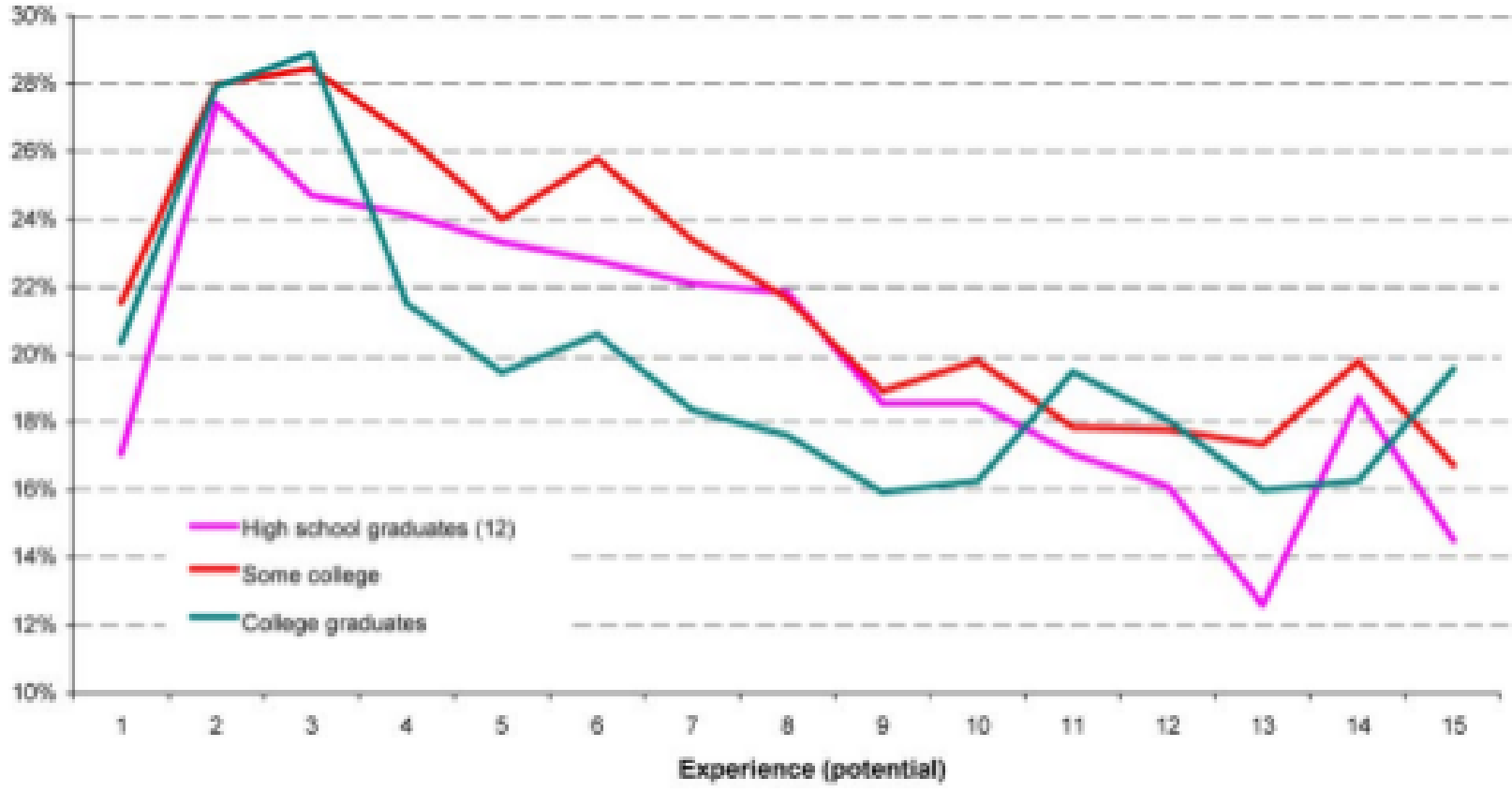

Figure 5c. Proportion of workers who changed occupation, industry or employers by education and experience, full-time workers, CPS-ORG, 1998–2002, and NLSY, 1979–2000.
Proportion of workers who changed employers (within one year), NLSY, 1979–2000.

Table 1
The average wage growth by education, experience, specification and data source

Experience	Data source	Education categories									
		Less than HSG		HSG (12)		Some college		College graduates		MA, Ph.D.	
		Level	Dif	Level	Dif	Level	Dif	Level	Dif	Level	Dif
0–10											
	CPS-ORG	0.024	0.039	0.032	0.056	0.033	0.063	0.036	0.063	0.029	0.077
		(0.003)	(0.029)	(0.001)	(0.010)	(0.001)	(0.010)	(0.002)	(0.011)	(0.003)	(0.017)
	PSID	0.028	0.043	0.030	0.057	0.038	0.065	0.039	0.076	0.032	0.110
		(0.003)	(0.007)	(0.002)	(0.003)	(0.003)	(0.005)	(0.003)	(0.004)	(0.006)	(0.021)
	NLSY	0.024	0.065	0.034	0.071	0.046	0.081	0.052	0.082	0.055	0.096
		(0.006)	(0.010)	(0.003)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.009)	(0.012)
11–15											
	CPS-ORG	0.016	0.007	0.022	0.033	0.022	0.055	0.022	0.045	0.018	0.053
		(0.002)	(0.034)	(0.001)	(0.011)	(0.001)	(0.012)	(0.001)	(0.012)	(0.001)	(0.020)
	PSID	0.019	0.030	0.020	0.021	0.026	0.021	0.027	0.029	0.022	0.013
		(0.002)	(0.007)	(0.001)	(0.004)	(0.002)	(0.005)	(0.002)	(0.005)	(0.004)	(0.016)
	NLSY	0.013	0.024	0.023	0.019	0.026	0.024	0.035	0.067	0.039	0.123
		(0.002)	(0.008)	(0.001)	(0.004)	(0.002)	(0.007)	(0.004)	(0.009)	(0.009)	(0.018)
16–25											
	CPS-ORG	0.010	0.052	0.013	0.022	0.012	0.026	0.009	0.026	0.009	0.015
		(0.001)	(0.021)	(0.000)	(0.007)	(0.000)	(0.008)	(0.001)	(0.009)	(0.001)	(0.012)
	PSID	0.011	0.010	0.012	0.010	0.015	0.014	0.017	0.026	0.014	0.019
		(0.001)	(0.004)	(0.001)	(0.003)	(0.001)	(0.004)	(0.001)	(0.004)	(0.003)	(0.009)
	NLSY	0.003	0.035	0.014	0.038	0.009	0.065	0.021	0.111	0.025	0.044
		(0.004)	(0.009)	(0.003)	(0.005)	(0.005)	(0.013)	(0.009)	(0.015)	(0.022)	(0.035)
25+											
	CPS-ORG	−0.002	0.025	−0.004	0.011	−0.005	0.002	−0.014	−0.002	−0.009	0.012
		(0.003)	(0.017)	(0.001)	(0.007)	(0.001)	(0.008)	(0.002)	(0.011)	(0.003)	(0.013)
	PSID	−0.003	0.004	−0.005	0.006	−0.005	0.010	−0.003	0.000	−0.001	0.011
		(0.001)	(0.003)	(0.002)	(0.003)	(0.003)	(0.005)	(0.004)	(0.005)	(0.005)	(0.006)
	NLSY	−0.015	0.034	−0.003	0.034						
		(0.012)	(0.042)	(0.007)	(0.041)						

Notes: The numbers in the "dif" columns are cell means and standard deviations. The numbers in the "level" columns are growth rates as implied by the estimated coefficients of the experience and experience squared terms in Mincer's wage equation.

Table 2a
Annual wage growth rates and proportions of gainers and losers, by education and experience; CPS-ORG, 1998–2002

		High school graduates		Some college		College graduates		Advanced degrees	
	Experience	Fraction	Wage growth	Fraction	Wage growth	Fraction	Wage growth	Fraction	Wage growth
All	0–10	1.000	0.056	1.000	0.063	1.000	0.063	1.000	0.077
	11–15	1.000	0.033	1.000	0.055	1.000	0.045	1.000	0.053
	16–25	1.000	0.022	1.000	0.026	1.000	0.026	1.000	0.015
	26–40	1.000	0.011	1.000	0.002	1.000	−0.002	1.000	0.012
Gainers (wage up)	0–10	0.602	0.259	0.621	0.255	0.643	0.263	0.667	0.253
	11–15	0.588	0.254	0.589	0.254	0.602	0.259	0.590	0.274
	16–25	0.562	0.264	0.582	0.257	0.567	0.268	0.567	0.250
	26–40	0.546	0.264	0.555	0.261	0.536	0.287	0.545	0.265
No wage change	0–10	0.048	−0.022	0.043	−0.035	0.055	−0.025	0.080	−0.003
	11–15	0.048	−0.017	0.056	0.001	0.081	−0.026	0.090	−0.038
	16–25	0.049	−0.018	0.053	−0.036	0.090	−0.031	0.083	−0.007
	26–40	0.053	−0.028	0.055	−0.037	0.085	−0.026	0.099	−0.020
Losers (wage down)	0–10	0.349	−0.289	0.336	−0.279	0.301	−0.350	0.253	−0.361
	11–15	0.363	−0.306	0.355	−0.267	0.317	−0.343	0.320	−0.329
	16–25	0.389	−0.325	0.364	−0.334	0.342	−0.359	0.349	−0.363
	26–40	0.401	−0.314	0.391	−0.361	0.378	−0.405	0.356	−0.366

Notes: Gainers (losers) had a nominal wage increase (decrease) between subsequent wage observations.
Fraction is the share within experience groups.

Table 2b
Annual wage growth and proportions of gainers and losers by experience groups and data source

		CPS-ORG		NLSY		PSID	
	Experience	Fraction	Wage growth	Fraction	Wage growth	Fraction	Wage growth
All							
	0–10	1.000	0.062	1.000	0.077	1.000	0.063
	11–15	1.000	0.044	1.000	0.033	1.000	0.024
	16–25	1.000	0.024	1.000	0.049	1.000	0.015
	26–40	1.000	0.007	–	–	–	–
Gainers (wage up)	0–10	0.627	0.259	0.718	0.176	0.726	0.163
	11–15	0.593	0.254	0.644	0.144	0.689	0.122
	16–25	0.568	0.264	0.662	0.168	0.667	0.118
	26–40	0.547	0.264	–	–	–	–
No wage change	0–10	0.053	−0.023	0.071	−0.044	0.040	−0.040
	11–15	0.065	−0.020	0.097	−0.040	0.048	−0.030
	16–25	0.065	−0.023	0.082	−0.041	0.056	−0.046
	26–40	0.066	−0.029	–	–	–	–
Losers (wage down)	0–10	0.319	−0.312	0.211	−0.221	0.234	−0.228
	11–15	0.342	−0.309	0.259	−0.217	0.263	−0.224
	16–25	0.367	−0.339	0.255	−0.232	0.277	−0.220
	26–40	0.388	−0.351	–	–	–	–

Notes: Gainers (losers) had a nominal wage increase (decrease) between subsequent wage observations. Fraction is the share within experience groups.

Table 2c
Annual wage growth and proportions of gainers, losers, movers and stayers in the NLSY, by experience groups

		All		Stayers		Movers	
	Experience	Fraction	Wage growth	Fraction	Wage growth	Fraction	Wage growth
All	0–10	1.000	0.077	0.800	0.082	0.200	0.052
	11–15	1.000	0.033	0.833	0.039	0.167	0.001
	16–25	1.000	0.049	0.833	0.055	0.167	0.014
Gainers (wage up)	0–10	0.718	0.176	0.739	0.170	0.625	0.208
	11–15	0.644	0.144	0.662	0.140	0.549	0.174
	16–25	0.662	0.168	0.680	0.162	0.568	0.207
No wage change	0–10	0.071	−0.044	0.070	−0.046	0.074	−0.034
	11–15	0.097	−0.040	0.100	−0.038	0.080	−0.049
	16–25	0.082	−0.041	0.083	−0.040	0.079	−0.045
Losers (wage down)	0–10	0.211	−0.221	0.191	−0.210	0.301	−0.250
	11–15	0.259	−0.217	0.238	−0.209	0.370	−0.244
	16–25	0.255	−0.232	0.237	−0.218	0.353	−0.283

Notes: Gainers (losers) had a nominal wage increase (decrease) between subsequent wage observations.
Movers (stayers) changed (did not change) employer between subsequent wage observations.
Fraction is the share within experience groups.

Questions

- What causes the large wage growth at the initial phase of the career?
- Why does wage growth decline?
- What are the interrelationships between wage growth, job change and labor supply?
- What causes the large variance in individual wage growth and who are the gainers and losers?

Models

Implications

- Investment
- Investment in school and on the job
- Search
- . . .

Investment

Implications

- For a constant R, investment declines as the worker ages and approaches the end his working life.
- Earnings rise along an optimal investment path. This is caused by two effects that reinforce each other; positive investment increases earning capacity and declining investment induces a rise in its utilization rate.

Implications

- If R varies with time, workers that expect exogenous growth in their earning capacity invest at a higher rate and their wage rises at a higher pace. Investment declines if the rate of growth in the rental rate decreases.

Investment in school and on the job

Implications

- Specialization in schooling occurs, if at all, in the first phase of life. It is followed by a period of investment on the job. In the last phase of the life cycle, there is no investment at all.

- During the schooling period, there are no earnings, yet human capital is accumulated at the maximal rate $(1+\gamma)$. During the period of investment on the job, earnings are positive and growing. In the last phase (if it exists), earnings are constant.

Implications

- A worker leaves school at the first period in which (10) is reversed. At this point it must be the case that $l_t^* < 1$, which means that at the time of leaving school, earnings must jump to a positive level. This realistic feature is present only because we assume different production (and cost) functions in school and on the job, whereby accumulation in school is faster but requires a larger sacrifice of current earnings.

Implications

- A person with a larger initial stock of human capital, $K > 0$, will stay in school for a shorter period and spend more time investing on the job. He will have higher earnings and the same earnings growth throughout life.
- A person with a larger scholastic learning ability, γ, will stay in school for a longer period and spend less time investing on the job. He will also have higher earnings and the same earning growth throughout life.

Search

Implications

- A job has an option value to the worker. In particular, he can maintain his current wage and move away when he gets a better offer. Consequently, earnings rise whenever the worker switches jobs and remain constant otherwise.

- The higher the worker's current wage, the more valuable is the current job; hence, the offers that the workers accepts must exceed a higher reservation value. Therefore, the quit rate and the expected wage growth decline as the worker accumulates work experience and climbs up the occupational ladder.

Implications

- A straight-forward extension is to add involuntary separations. Such separations are usually associated with wage reduction and are more likely to occur at the end of the worker's career, which may explain the reduction in average wages towards the end of the life cycle.

Appendix

References

Rubinstein, Y., & Weiss, Y. (2006). Post schooling wage growth: Investment, search and learning. In E. Hanushek & F. Welch (Eds.), *Handbook of the economics of education* (Vol. 1, p. 1 - 67). Elsevier.