Introduction to the Economics of Human Capital

Philipp Eisenhauer

Some Facts

Figure: Years of schooling

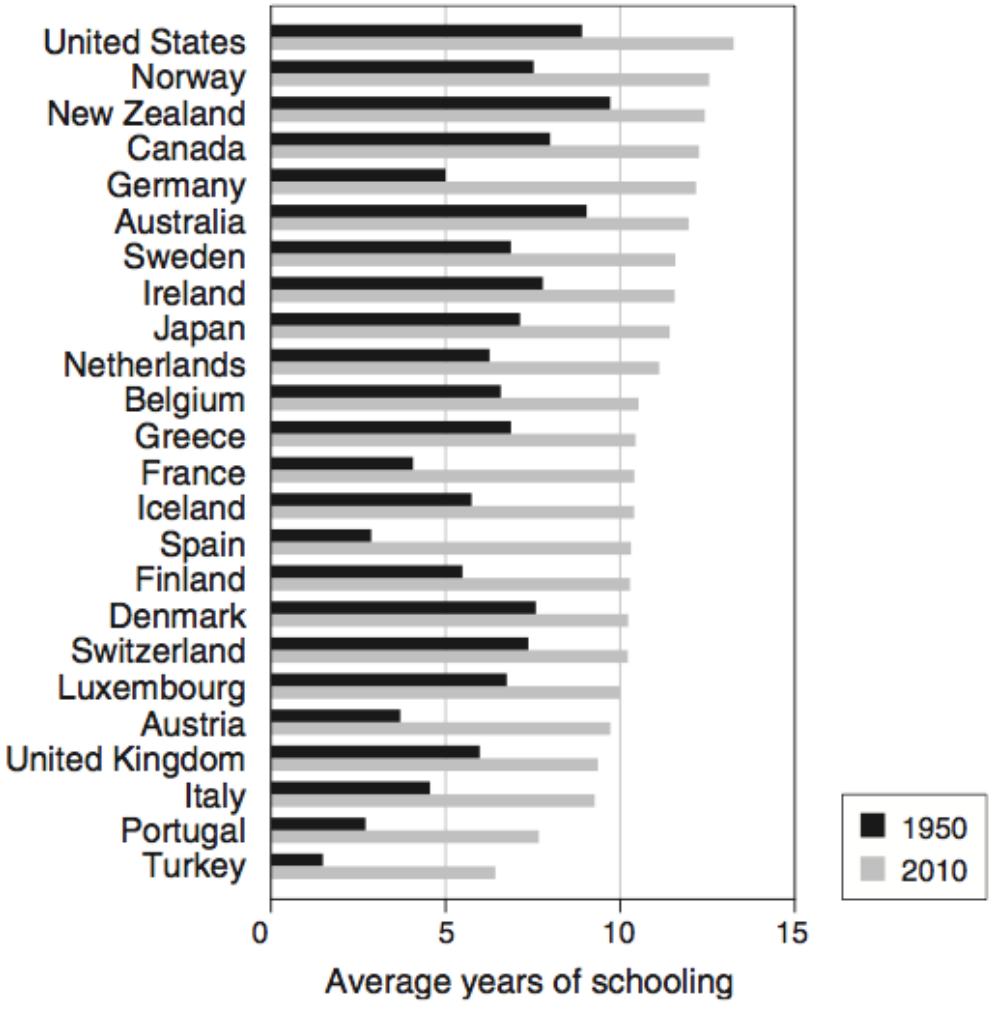


FIGURE 4.4

Years of schooling of the total population aged 25 and older.

Source: Barro and Lee (2010, education data set, available at www.barrolee.com/data).

Figure: Wage gains

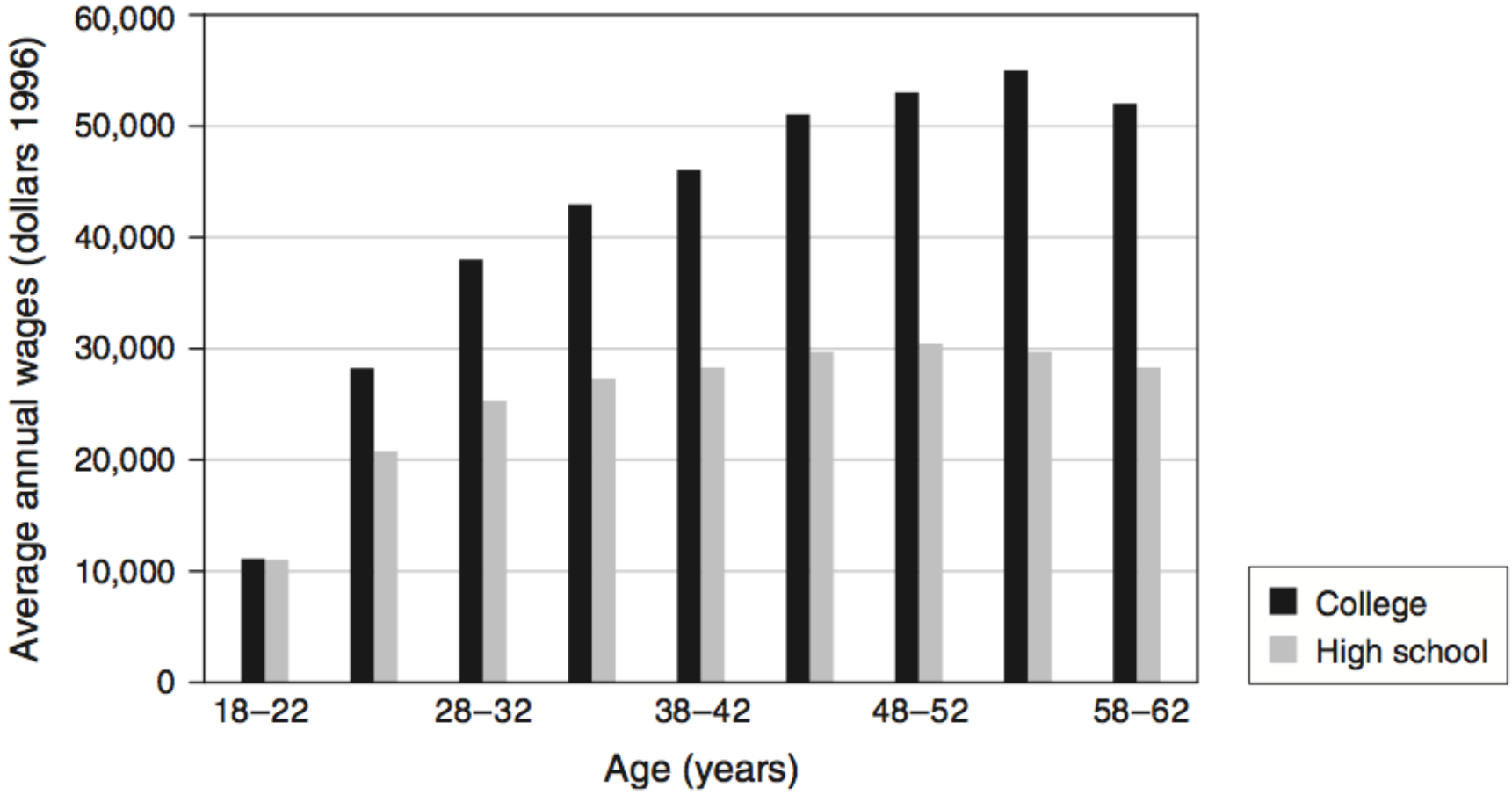


FIGURE 4.8

Average wage gains for college and high school graduates in the United States in 1996.

Source: Ashenfelter and Rouse (1999).

Figure: Unemployment rates

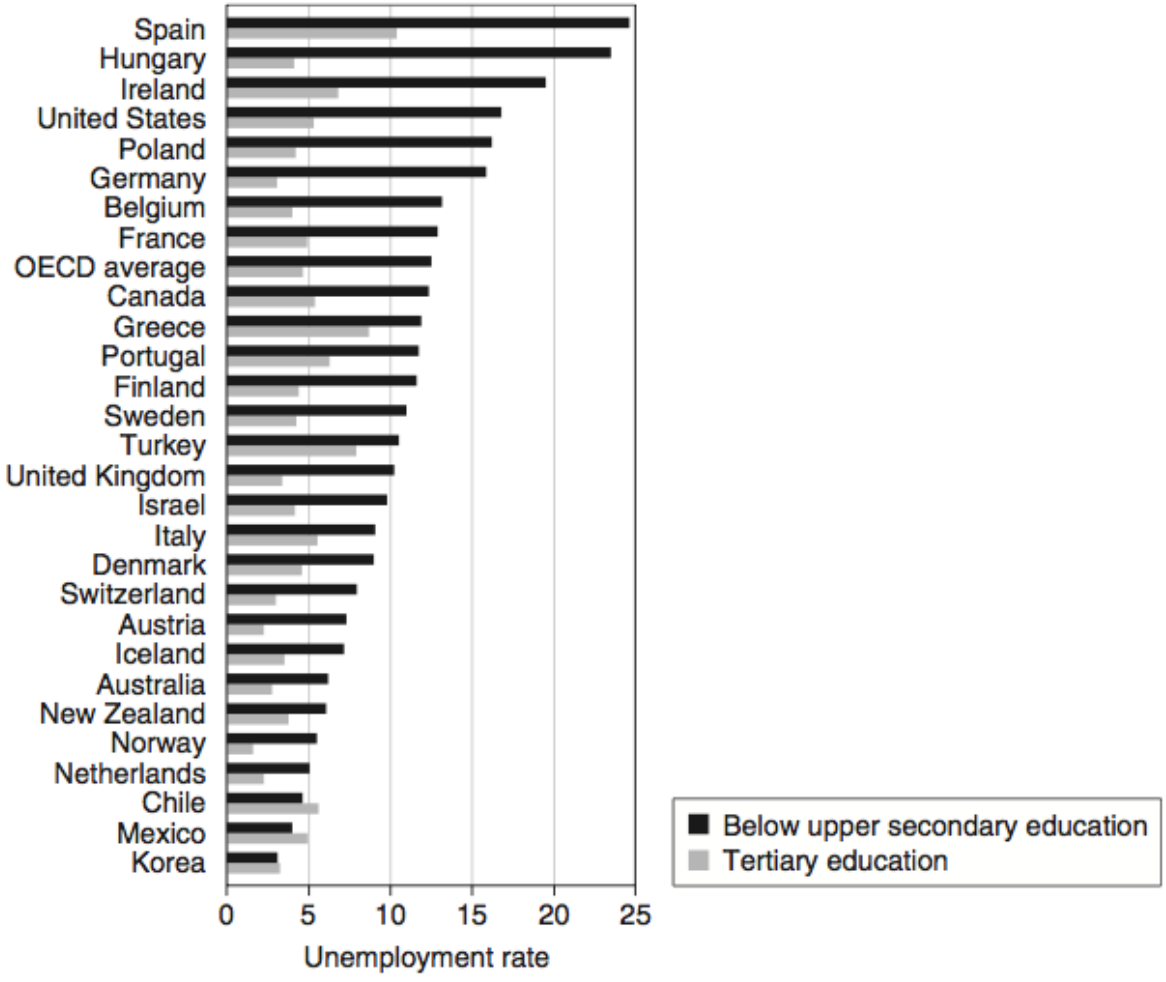


FIGURE 4.6

Unemployment rates by level of educational attainment for 25- to 64-year-olds, 2010. The OECD average is the nonweighted average of the 34 OECD countries, including those not represented on this figure. Data missing for non-OECD countries.

Source: OECD (2012, table A7.4a, p. 133).

Figure: Unemployment rates

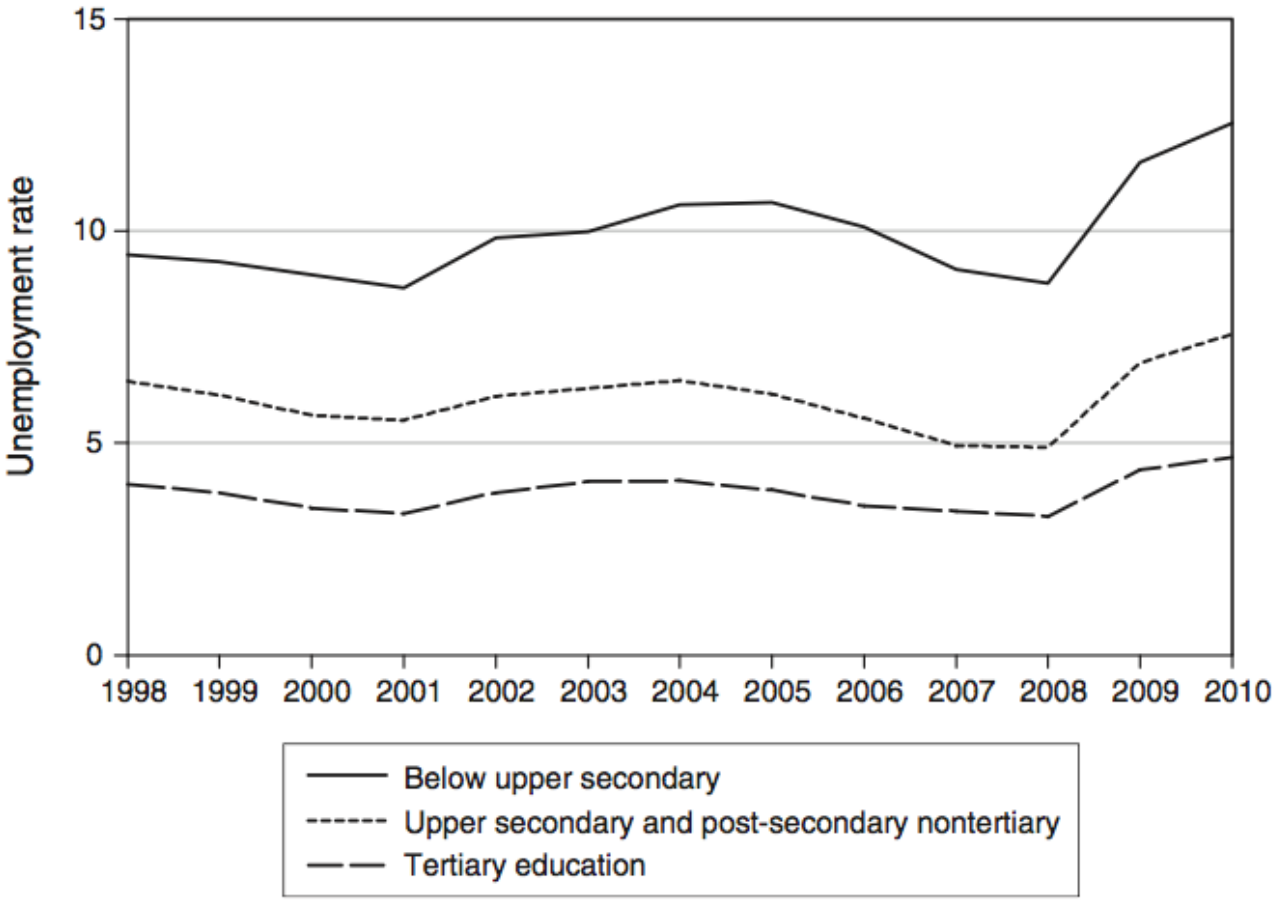


FIGURE 4.7

Unemployment rates by level of educational attainment for 25- to 64-year-olds, 2010. The OECD average is the nonweighted average of the 34 OECD countries.

Source: OECD (2012, table A7.4a, p. 133).

Figure: Tertiary education

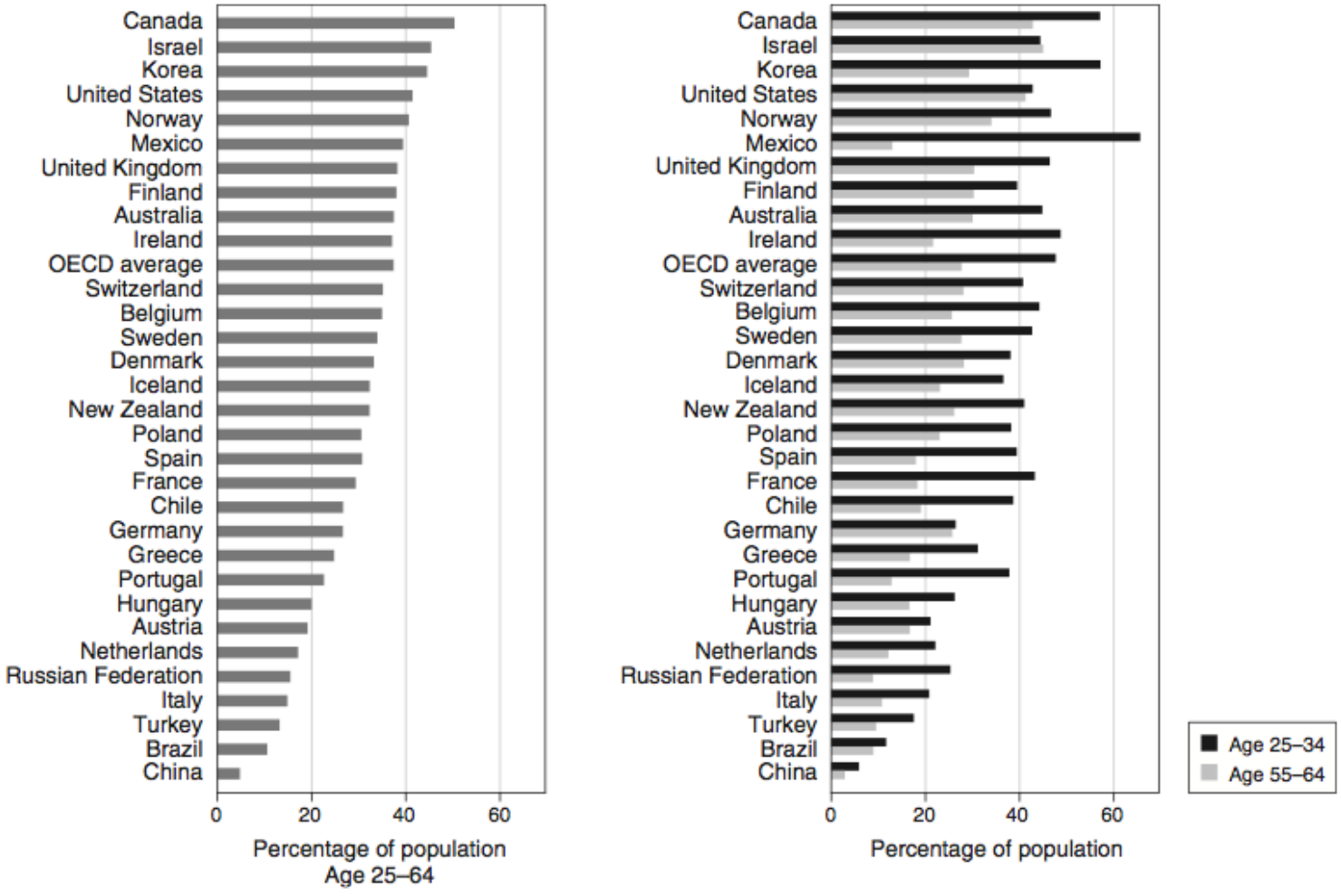


FIGURE 4.3

Percentage of the population that has attained at least tertiary education or advanced research programs, by age group, 2010. The OECD average is the nonweighted average of the 34 OECD countries, including those not represented in this figure. Brazil, China, and the Russian Federation are not part of the OECD.

Source: OECD (2012, table A1.3a, p. 36).

Figure: Secondary education

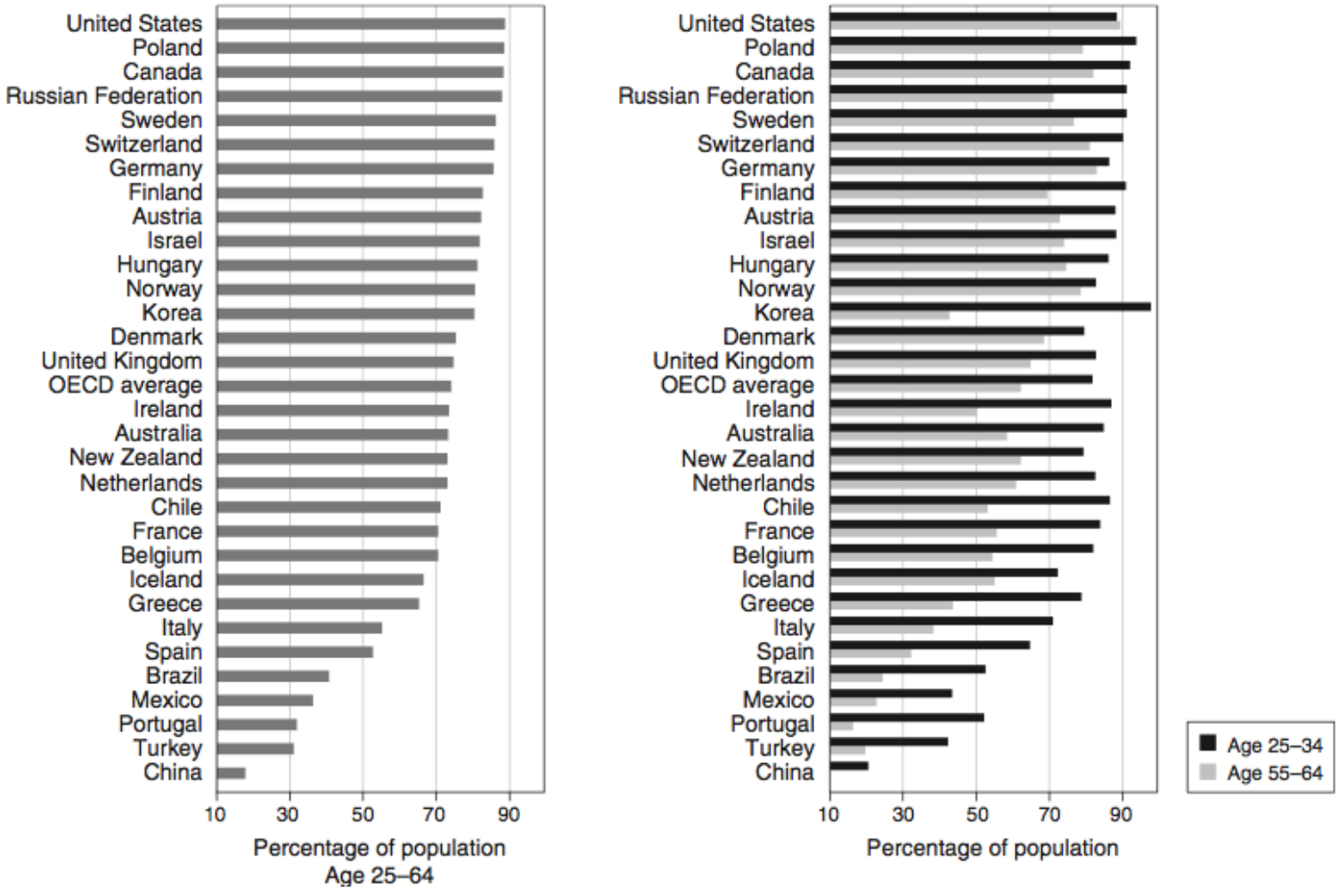


FIGURE 4.2

Percentage of the population that has attained at least upper secondary education, by age group, 2010. The OECD average is the nonweighted average of the 34 OECD countries, including those not represented in this figure. Brazil, China, and the Russian Federation are not part of the OECD.

Source: OECD (2012, table A1.2a, p. 35).

Figure: Relative earnings

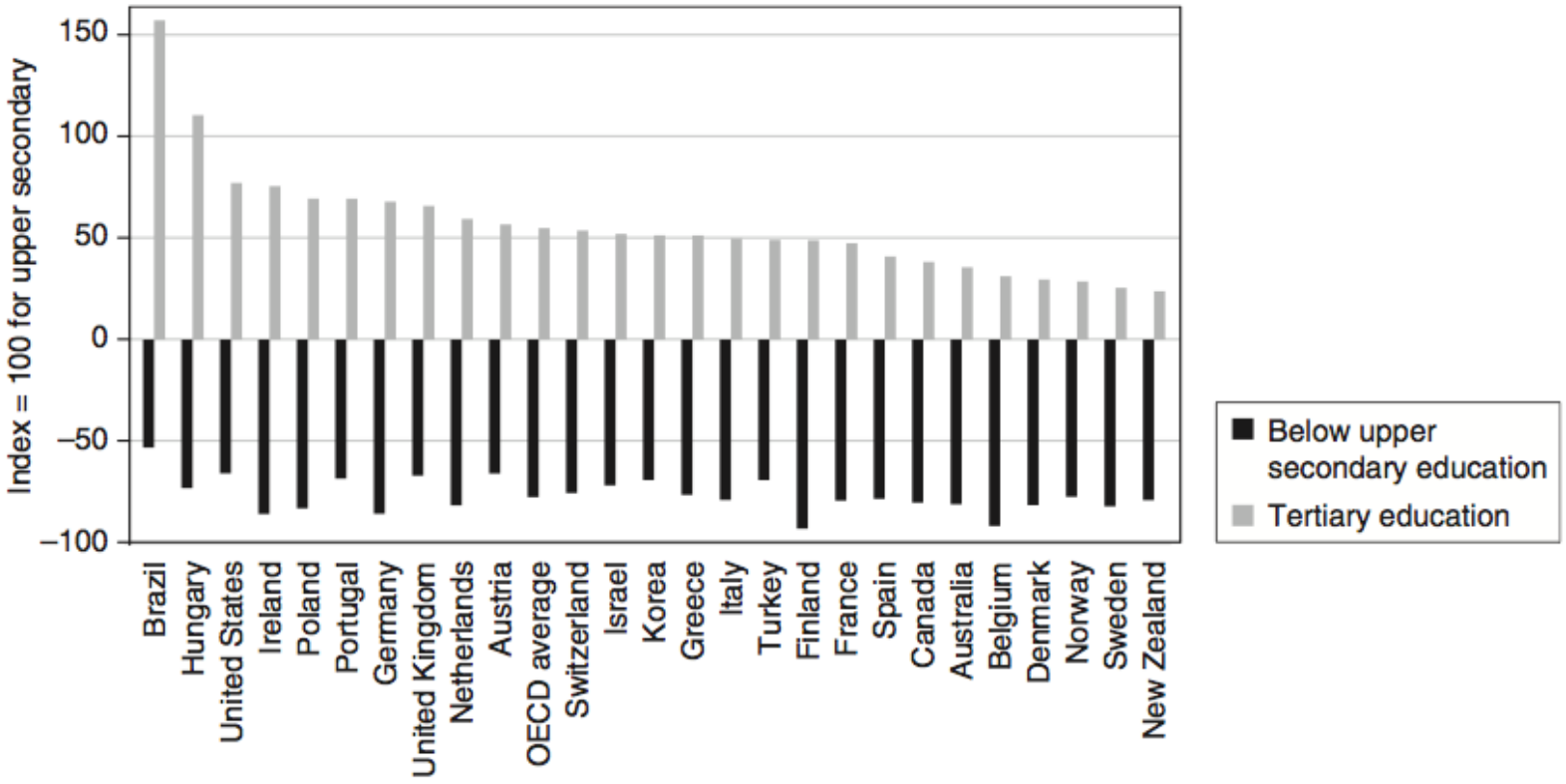


FIGURE 4.5

Relative earnings from employment among 25- to 64-year-olds, by level of educational attainment (2010 or latest available year). Upper secondary and post-secondary nontertiary education = 100. The OECD average is the nonweighted average of the 34 OECD countries, including those not represented in this figure. Brazil is not part of the OECD. Data missing for Chile, China, Iceland, Mexico, and the Russian Federation.

Source: OECD (2012, chart A8.1, p. 140).

Figure: Expenditures

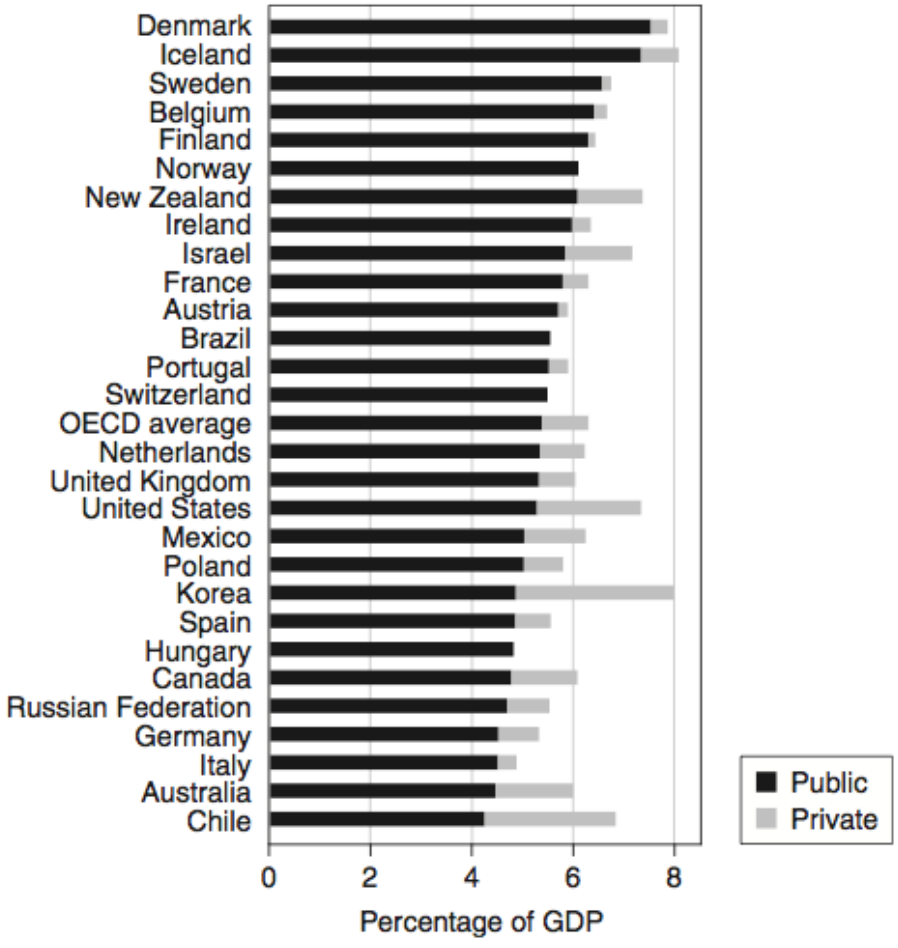


FIGURE 4.1

Expenditure on educational institutions as a percentage of GDP, 2009. The OECD average is the nonweighted average of the 34 OECD countries, including those not represented in this figure. Brazil and the Russian Federation are not part of the OECD. Private expenditure is missing for Brazil, Hungary, Norway, and Switzerland. Data are missing for China, Greece and Turkey.

Source: OECD (2012, table B2.3, p. 246).

Theory of Human Capital

We study the seminal Ben-Porath Model (Ben-Porath, 1967).

$s(t)$	fraction devoted to training
$h(t)$	stock of human capital
$w(t)$	income
δ	depreciation of knowledge

The individual's objective is to maximize the discounted sum of wages over their life-cycle income.

$$\Omega = \int_0^T w(t)\, e^{-rt} dt$$

Their economic environment is characterized by the production functions for income and human capital.

$$w(t) = A[1 - s(t)]h(t)dt$$

$$\dot{h} = \theta g[s(t)h(t)] - \delta h(t) \qquad g' > 0, g'' < 0$$

Model Specification

We study the implementation in Cahuc and Zylberberg (2004).

$$g(h(t), s(t)) = (h(t)s(t))^{0.71}$$

$$A = 0.75 \qquad \delta = 0.06 \qquad r = 0.05$$

$$h_0 = 5 \qquad T = 60 \qquad \theta = 0.5$$

The implementation is available online.

Figure: Human capital production I

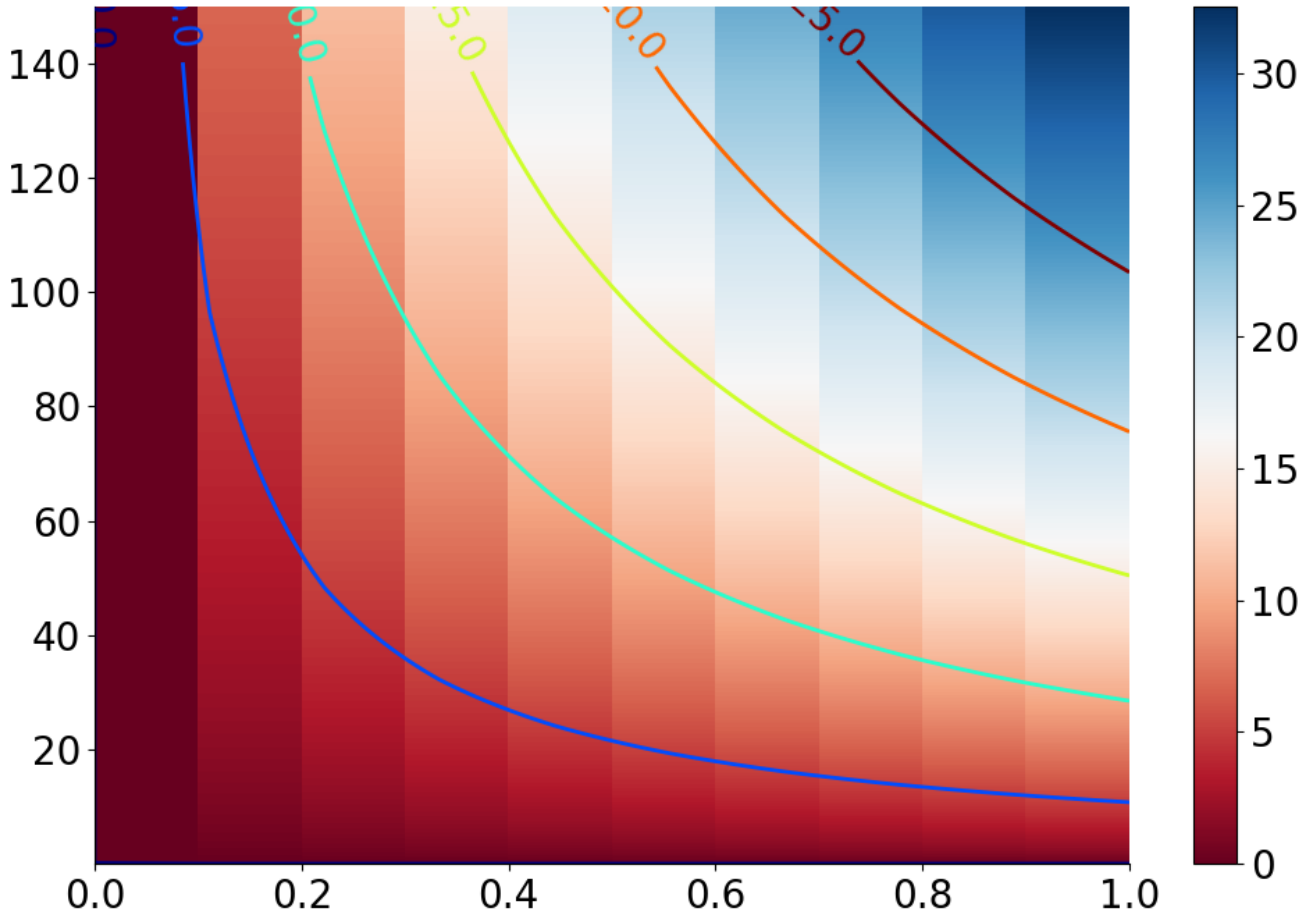


Figure: Human capital production II

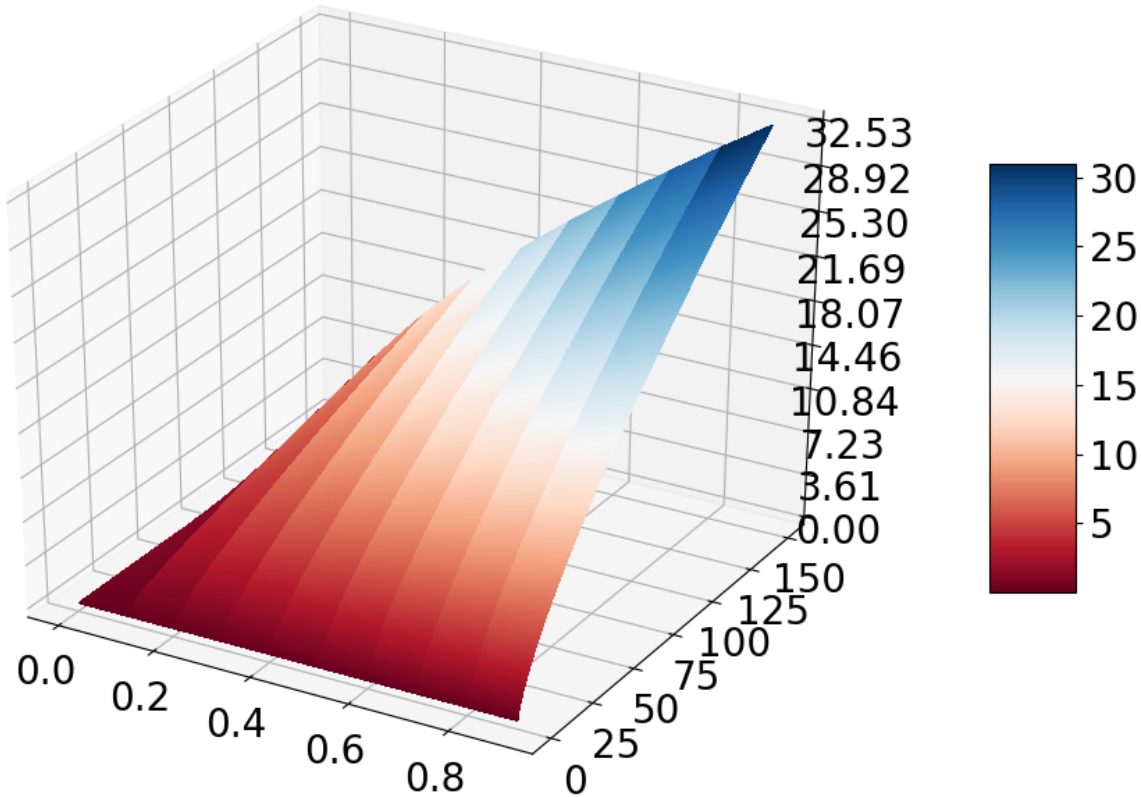


Figure: Income production

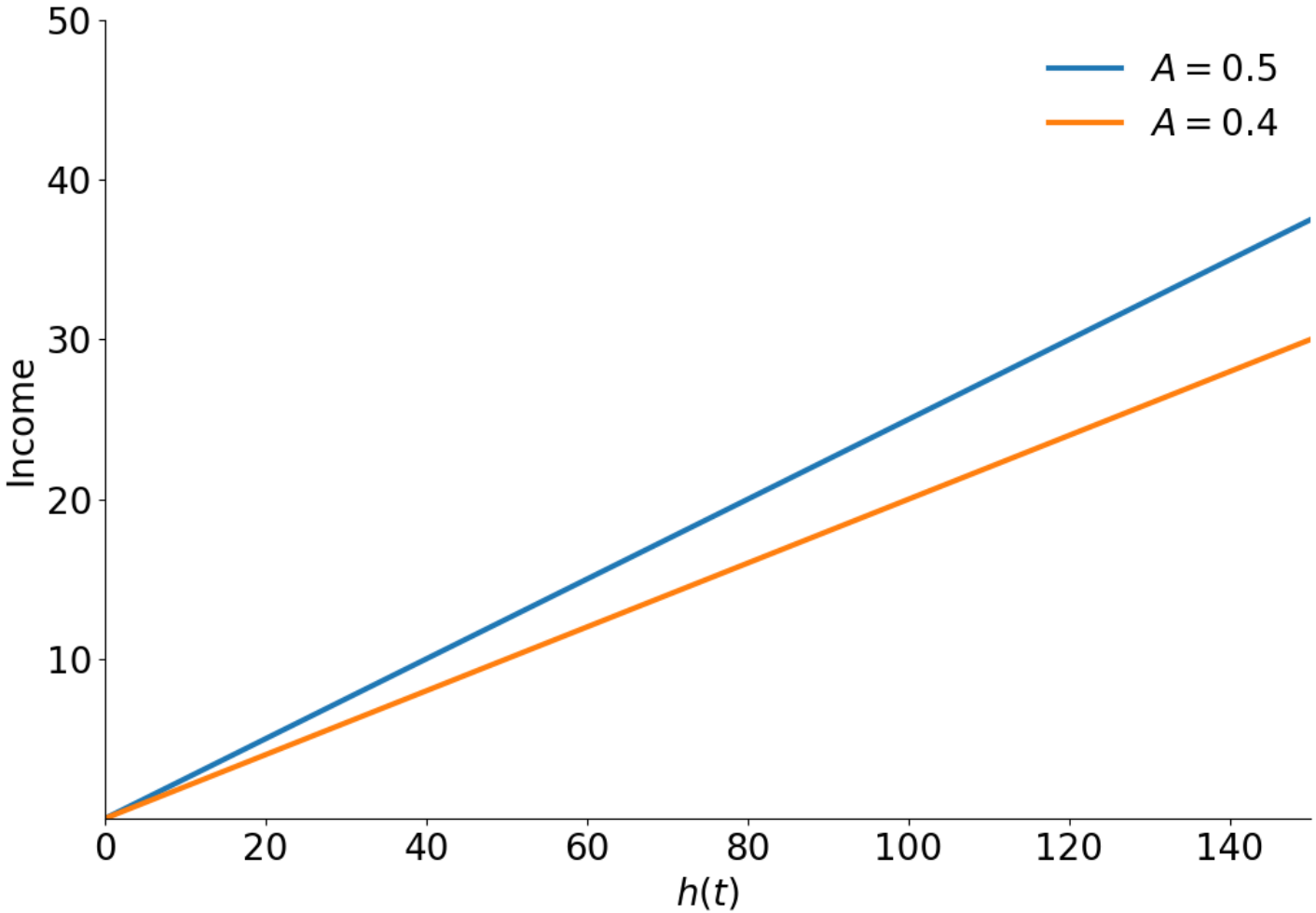


Figure: Income over the life-cycle

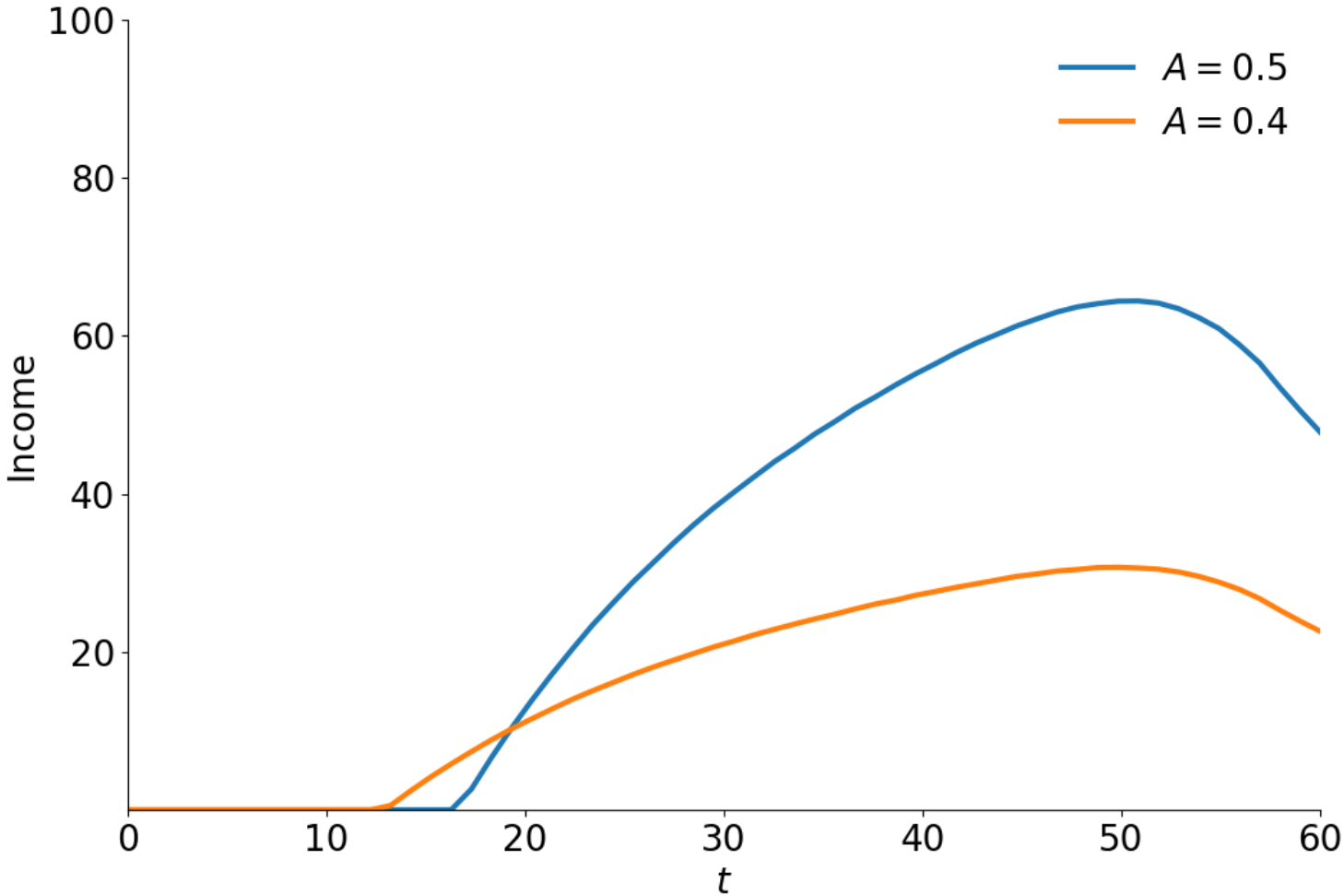


Figure: Stock of human capital over the life-cycle

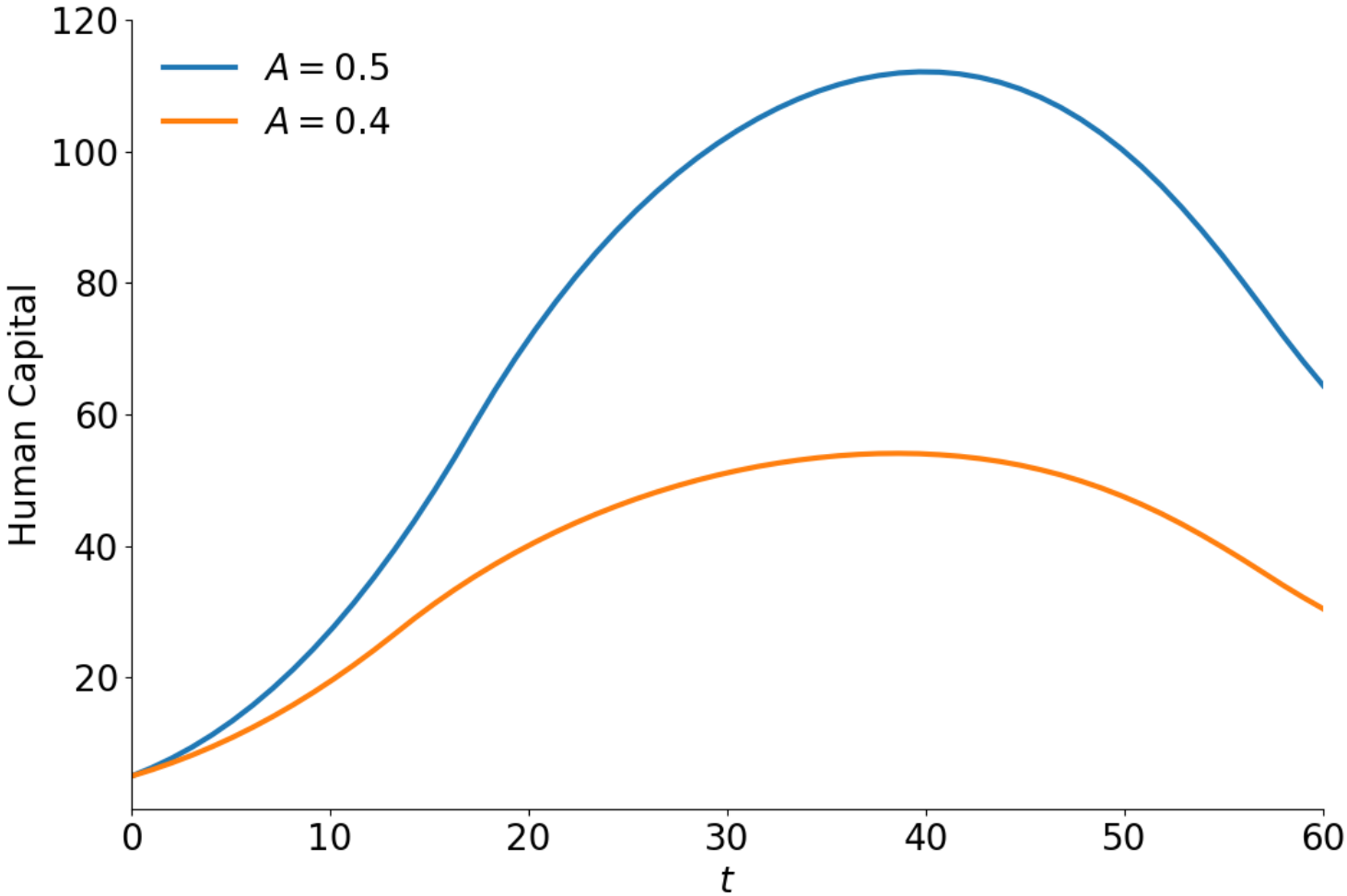
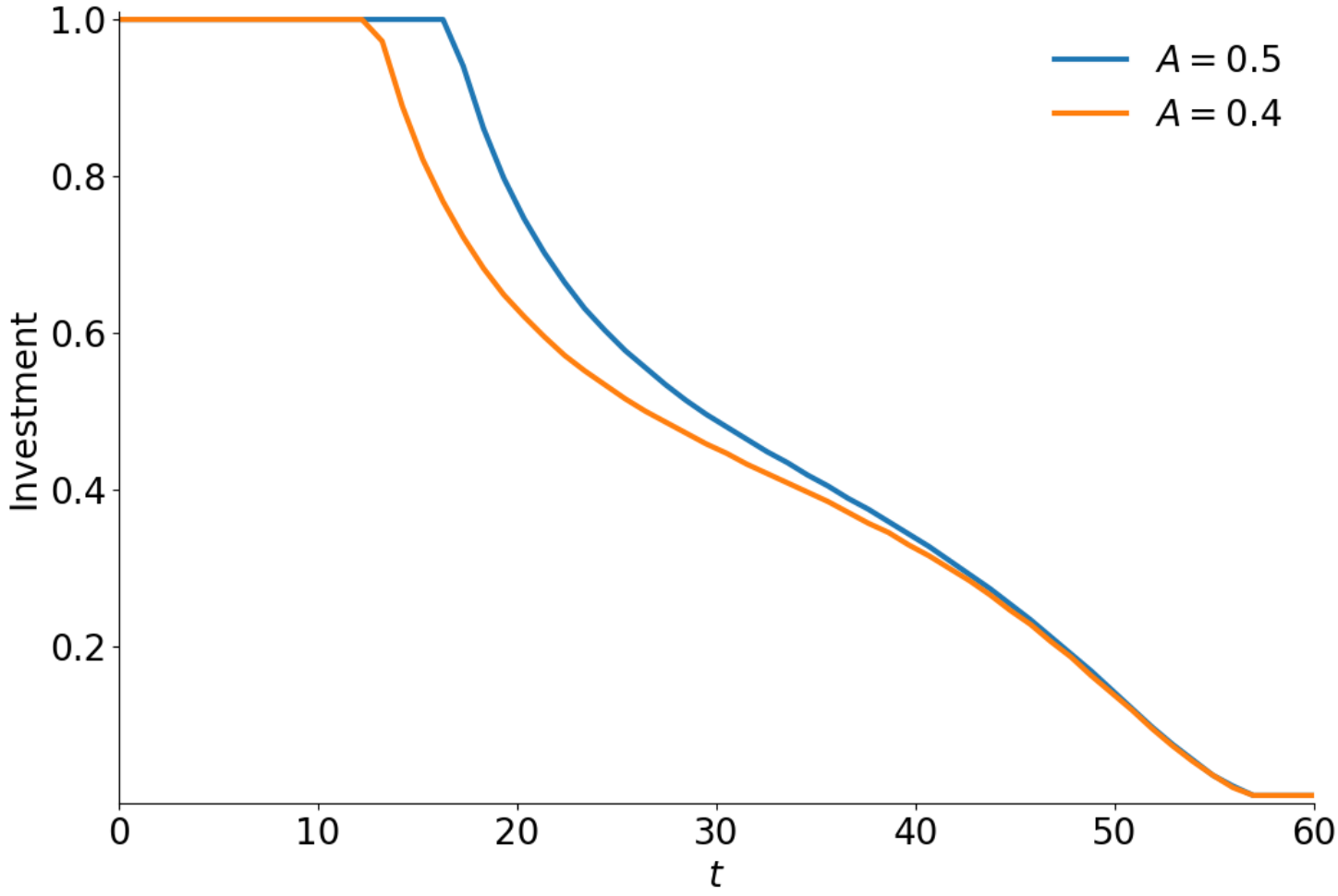


Figure: Human capital investment over the life-cycle



Extensions

? (?) reviews a host of alternative extensions to the basic model.

- general versus specific training
- hours worked
- uncertainty
- . . .

Theory of Signaling

Appendix

References

Ben-Porath, Y. (1967). The production of human capital and the life cycle of earnings. *Journal of Political Economy*, *75*(4), 352–365. Retrieved from http://www.jstor.org/stable/1828596 doi: doi: dx.doi.org/10.1086/259291

Cahuc, P., & Zylberberg, A. (2004). *Labor economics* (1st ed.). Cambridge, MA: MIT Press.

Heckman, J. J., & Vytlacil, E. J. (2007a). Econometric evaluation of social programs, part i: Causal effects, structural models and econometric policy evaluation. In J. J. Heckman & E. E. Leamer (Eds.), *Handbook of econometrics* (Vol. 6B, pp. 4779–4874). Amsterdam, Netherlands: Elsevier Science.

Heckman, J. J., & Vytlacil, E. J. (2007b). Econometric evaluation of social programs, part ii: Using the marginal treatment effect to organize alternative economic estimators to evaluate social programs and to forecast their effects in new environments. In J. J. Heckman & E. E. Leamer (Eds.), *Handbook of econometrics* (Vol. 6B, pp. 4875–5144). Amsterdam, Netherlands: Elsevier Science.