Returns to Education: A short history

Applied Microeconomics

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Why "the return to schooling" is the canonical labour question

- **Empirically central**: the single most-estimated number in labour economics
- **Policy-relevant**: every government runs a schooling-subsidy / compulsory-schooling policy and wants to know what it buys
- **Theoretically loaded**: every assumption you make about preferences, markets, selection, dynamics shows up *somewhere* in the estimate

Goal of this screencast: build the conceptual layers from Mincer (1958/1974) to Liu–Mogstad–Salvanes (2025), so you can read the modern paper as the latest answer to a 60-year-old question.

Mincer (1958, 1974): the seed

The Mincer earnings equation:

$$\log Y_i = \alpha + \rho \cdot S_i + \beta_1 \cdot X_i + \beta_2 \cdot X_i^2 + \varepsilon_i$$

- S_i: years of schooling
- X_i: potential labour-market experience (= age − S_i − 6)
- ρ: the Mincer return, $\partial \log Y / \partial S$

Beautifully simple, fits cross-sections astonishingly well, and gave the field a shared language.

What is hidden inside ρ?

Mincer's ρ is a *causal* parameter only under a long list of assumptions:

1. **No selection on gains**: everyone has the same ρ
2. **No selection on levels**: $\varepsilon_i \perp S_i$ (ability does not drive schooling)
3. **Multiplicative separability** between schooling and experience
4. **No earnings while in school**
5. **Exogenous post-schooling employment**: no selection into work
6. **Stationarity**: the cross-section reads off the life cycle

Post-1970 literature mostly is the slow, careful *relaxing* of one assumption at a time.

1970s–80s: Ability bias

- *Concern*: $\mathrm{Cov}(S, \varepsilon) \neq 0$, high-ability people stay in school *and* earn more anyway
- *Fixes*:
  - control for ability proxies (IQ, AFQT): Griliches, Card, …
  - identical twins: Ashenfelter–Krueger
  - sibling/family fixed effects

Twin estimates suggested OLS was *not* badly biased, but the question of selection on **gains** was still open.

1990s: The IV revolution

Card (1995), Angrist–Krueger (1991), Harmon–Walker (1995), Oreopoulos (2006), Meghir–Palme (2005), Pischke–von Wachter (2008), Black–Devereux–Salvanes (2005), ...

The basic move: find a Z_i that shifts S_i but is plausibly independent of ε_i:

- **Quarter of birth × compulsory schooling laws** (US)
- **Geographic proximity to college**
- **Tuition changes**
- **Compulsory schooling reforms**: the workhorse, and the basis for LMS

Result: A flurry of LATE estimates, typically *larger* than OLS.

Selection on gains running the "wrong" way, or weak-instrument bias?

The LATE-as-an-answer problem

Imbens & Angrist (1994), Imbens & Rubin (1997):

- IV identifies $E[Y(1) - Y(0) \mid D(1) > D(0)]$: the **complier LATE**
- Compliers are unobserved; their LATE may differ a lot from the ATE

For *one year more of compulsory schooling for a kid who would otherwise have stopped at 7*, the IV literature gave you a credibly identified average return, for *that* margin, in *that* country, in *that* cohort.

Heckman/Vytlacil and others: don’t stop at one number; recover the full MTE.

What is the dependent variable, actually?

Even the well-identified LATE only gives one moment of one outcome at one age. The full economic question has many more dimensions:

- **Lifetime** earnings, not earnings at age 30
- **Variance** of earnings, not just the mean
- **Employment**: does education buy you out of unemployment?
- **Family income** after spousal labour supply, taxes, transfers
- **Consumption**: what is the welfare value of the gross return?

Each of these is a different "return", and they need not move together.

Where LMS sit in the arc

Layer	Assumption relaxed
Mincer (1974)	OLS on cross-section, constant ρ
Card (1995) et al.	IV → LATE for compliers
Card (2001), HV (2005)	MTE → heterogeneous returns
LMS (2025) reduced-form	IV for **distribution** of potential outcomes over life cycle
LMS (2025) structural	precautionary saving → **welfare** return

LMS use the Norwegian compulsory schooling reform (an old friend of IV) but ask of the data far more than just a mean LATE: they target the whole joint distribution of earnings, employment, and dispersion.