

Know Thyself: A Decision-Theoretic Model of Over-Education and Educated Unemployment

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Educated Unemployment

*“If in a country like India the government were really determined to change the prevailing attitudes and institutions, and had the courage to take the necessary steps and accept the consequences, then these would include the effective abolition of caste, prescribed by the constitution, [...] land reform and tenancy legislation, [...] the eradication of corruption at all levels [,] forceful attack on **the problem of the educated unemployed** and their refusal to do manual work, and so on”.*
[Emphasis added]

- Gunnar Myrdal, *Asian Drama* (1968),
quoted in Kaushik Basu (2018), *WIDER* working paper

“The problem of the educated unemployed”

What *is* “the problem of the educated unemployed”?

- In many developing countries, the unemployment rate among the educated is not only high but often even surpasses the rate of uneducated or low-skilled unemployment
- Yet: Demand for higher education in developing countries continues to grow, despite a surplus in educated workers

So is it (primarily) a developing country problem? (Jeffrey (2013 EPW), Jeffrey and Dyson (2017 book chapter) on India, Girsberger and Meango (2017 WP) on West Africa)

- The rise of ‘bullshit jobs’
- UK: some debate. (O’Leary and Sloane, 2014 IZA DP)

“The problem of the educated unemployed” (continued)

Set aside, for now: “their refusal to do manual work”

Here, we focus on ‘Over-education’: ‘too many’ people with (higher) education chasing ‘too few’ jobs (that require the skills acquired in education).

Several explanations in the literature

Playing the odds: 'Harris-Todaro' style model of education acquisition

- Perhaps exacerbated by bursaries and subsidies for higher education

Disguised unemployment

Intrinsic utility: 'education for its own sake'

'Status'-seeking: or, a 'marriage qualification'

Aspirations, and a ratchet effect – preferences change as a consequence of acquiring education.

- This explanation is not as straightforward as it might appear – if my period-zero self can foresee this, then surely that affects my decision? Perhaps requires some hyperbolic discounting. Or some willingness to ignore information (a la Benabou Tirole (2002 QJE)) that deter me from my chosen path.

Explanations (continued)

Over-confidence – large literature, especially on entrepreneurs, but also more generally.

- Caveat: ‘Apparent over-confidence’ is not necessarily because of ‘true’ over-confidence (Benoit and Dubra 2011 Ecta)
- Although... Benoit Dubra Moore (2015 JEEA) find mixed experimental evidence for/against that.

In this paper: similar interpretation of (over-)confidence or ‘overplacement’: each agent gets a signal about their ‘ability’ and where it places them in the population distribution.

- But the signal is *symmetrically* distributed around their true ability: no over-confidence.

A Model of Over-education

Consider a population of heterogeneous 'intrinsic ability', a , which ranges between 0 and M .

Each agent in this population gets a noisy signal, s , about their true ability, a .

Key point: The signal, s , is symmetrically distributed around the true ability, a . It does no harm to assume that it is uniformly distributed: so $s = a + b$, with probability density of $1/(2v)$ in the interval $[a-v, a+v]$

Each agent has to decide whether to acquire higher education (i.e., 'go to college').

Set the cost of acquiring higher education to be the same for all agents.

Noisy signal

Key assumption: The signal is most noisy for intermediate values of a

Intuition: an agent in the tail of the ability distribution is less likely to consider themselves average, than an average person might fancy themselves in the tail. (Stronger assumption than we need: it suffices to assume this for agents in the upper part of the ability distribution. We can allow low-ability agents to be somewhat 'over-confident' without affecting the results).

Note: not the Dunning Kruger effect.

Not quite Bertrand Russell: "The whole problem with the world is that fools and fanatics are always so certain of themselves, and wiser people so full of doubts".

Basu quoting Arrow quoting Sherlock Holmes: "I cannot agree with those who rank modesty among the virtues. To the logician all things must be seen as they are, and to underestimate one's self is as much departure from truth as to exaggerate one's own powers".

Noisy signal

Key assumption: The signal is most noisy for intermediate values of a

In other words, the variance of b is highest for intermediate values of a , and lowest in the tail.

So, for example, for the uniform distribution, with $b \sim U[-v, +v]$, let $v = C \cdot \min\{M-a, a\}$ where C is some constant.

- Could also allow C to be a function of a - for example, set:

$$C = 2 \cdot \min\{M-a, a\} / M,$$

so that $C = 1$ when $a = M/2$, and declines to 0 as a tends to 0 or M .

Education acquisition: payoff

Payoff to acquiring higher education:

One, *pace* Spence, assume that going to college *does* increase the worker's productivity. (This productivity increase can be (vanishingly) small, and smaller than the cost of acquiring education). The productivity increase is an increasing function of the worker's true ability, i.e., the highest-ability workers benefit (their employers) the most, from acquiring education.

Two, acquiring higher education reveals, to the agent and to prospective employers, their true ability, a . (Again, *pace* Spence, higher education is not purely a signal – it reveals the true ability).

Hence, not quite Spence.

Dualism: the structure of the economy

Suppose that this is a dualistic economy: there is a formal/modern sector, and the traditional/informal sector ('unemployment').

Assume that wages are fixed, and the formal/modern sector wage exceeds that in the informal/traditional sector.

In the modern sector, productivity is increasing in ability, a . Hence employers would rather hire high- a workers. In the traditional sector, worker productivity is constant, independent of ability.

Assume that the size of the two sectors is fixed: let T denote the proportion of jobs in the traditional sector.

Assume that $T > 1/2$. (Hence, a model of a developing country).

Education acquisition decision

First best, full information, benchmark: agents with the highest ability (the 'top T proportion') are hired in the formal sector.

Should they acquire education? Depends on the increase in productivity, relative to the cost of education, for these 'top T' workers.

With the noisy signal, the agent faces a decision: acquire education? Depends on the signal, and the variance.

Education acquisition decision (continued)

Consider two possibilities:

One, 'sophisticated' agents, who can construct the conditional distribution, based on the signal that they receive, and calculate the (cumulative) probability that their true ability is in the 'top T'.

Two, 'naïve' agents, who take their signal as given, and act purely according to that.

For simplicity, assume the latter.

Education acquisition decision (continued)

Here, we focus on the separating equilibrium: Agents with a 'high enough' signal choose to acquire education, while agents whose signal is below a certain threshold will choose not to go to college. What proportion of agents choose to acquire education?

Proposition: ('Over-education')

The proportion of agents who choose to acquire education exceeds $M - T$.

In other words, more than the 'top T ' proportion acquire higher education. Why?

Recall: the 'error' that agents make, in estimating their true ability, is *unbiased*. The 'error term', b , is *symmetrically* distributed around the true ability, a .

So an agent is just as likely to be "under-confident" as they are to be "over-confident".

Education acquisition decision (continued)

In other words, more than the 'top T' proportion acquire higher education. Why?

Intuition:

On the one hand, some agents above the 'T threshold' receive low signals, and choose not to invest in education.

On the other hand, some agents below the threshold receive high signals and choose to invest in education.

But on balance, because of the lower variance in the upper tail, **the latter outnumber the former.**

Discussion

Self-evaluation of ability: some evidence that it's better in the 'upper tail', i.e., the accuracy of self-assessment improves with increasing expertise.

(Survey: Alba and Hutchinson (1990 Jnl of Consumer Res).

Predominantly a model of a developing country phenomenon?

Employment share of modern sector assumed to be $< \frac{1}{2}$.

(Hence a problem of over-education rather than under-education).

Inter-sectoral wage gap: does a larger gap exacerbate the problem?

(Intuitively plausible, but this is not straightforward.)

Is the noisiness of the signal greater in developing countries?

(Lower accuracy of assessment systems; less consistent feedback.

Perhaps ability is multi-dimensional, but evaluation systems measure only some dimensions).

Extensions

Not obvious how the effects of these would play out

- Relaxation of credit constraints
- Educational expansion
- Social protection

Policy implications?

Better self-evaluation of ability – along the lines of the interesting intervention in Bobba and Frisancho (2016 IZA DP)

Focus here has been on ‘economic outcomes’. Wider concern that unmet expectations of educated (unemployed) youth might be a driver of political unrest - Elsayed and Wahba (2017 IZA DP) on Egypt, Campante and Chor (2012 JEP) on the Arab Spring, Rodrik (2019) on India.

Conclusion

A simple model of education acquisition, with noisy signal about ability.

Implication: over-education, and educated unemployment – even when that signal is symmetrically noisy.

Hence, not a model of over-confidence – rather, in equilibrium, some agents *under-invest* in education.

Possible implications for policy: improving the accuracy of (self-)evaluation, inter-sectoral wage gaps, share of ‘skilled’ jobs, relaxing credit constraints.

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