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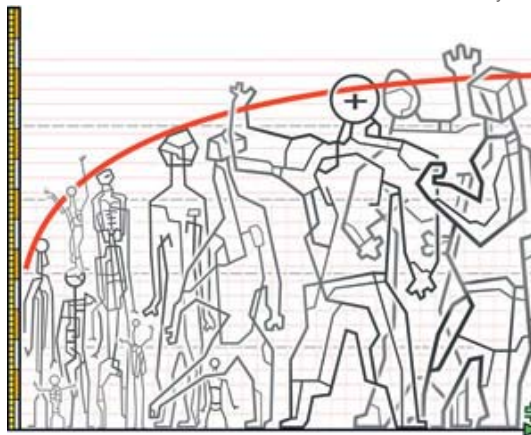
Economics focus

Feet, dollars and inches

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Illustration by Jac



The intriguing relationship between height and income

"PALE and haggard faces, lank and bony figures...boys of stunted growth, and others whose long meagre legs would hardly bear their stooping bodies." Charles Dickens's wrenching accounts of child labour helped to inspire a series of factory laws in 19th-century Britain. Indeed, by the 1870s factory owners claimed that it was they who were stooping under the burden of regulation. The new laws required a medical inspector to certify that a child was old enough and strong enough to work. Unhappy about the cost of these examinations, the manufacturers proposed a cheaper shortcut: a quick measure of a child's height to establish his age and stamina.

In 1876 Charles Roberts, an inspector, reported the statures of about 10,000 children, drawn from the registers of London military hospitals and his own tallies in Lancashire, Yorkshire and Cheshire. It was one of the first sophisticated statistical inquiries into the economics of height. Later scholars have explored the economic determinants of height (rich people are taller, on average), its economic consequences (tall people are richer, on average), and the clues it gives about a society's standard of living.

But Mr Roberts's results disappointed the Victorian bosses. Yes, taller children were older and stronger on average. But he found eight-year-olds as tall as 13-year-olds, and boys of ten who weighed twice as much as others the same age. This distribution was viewed by the 19th-century Belgian mathematician Adolphe Quetelet as God's "curve of error", as if the tall and the short were deviations from a correctly proportioned "*homme moyen*", or average man. The variation meant that you could not use the mean to infer anything about an individual: Mr Roberts could say that the average height of 11-year-old boys was 52½ inches, but not that this boy of 52½ inches was 11.

Nonetheless, manufacturers were right to suspect that taller people, on average, were more employable. Surprisingly, this remains true in the knowledge economy of today's America and not just the factory economy of Victorian Britain. The tallest quarter of the population earns 9-10% more than the shortest quarter, according to two recent studies. Nicola Persico and Andrew Postlewaite of the University of Pennsylvania and

Dan Silverman of the University of Michigan think this is because height gives adolescents self-confidence and helps them learn valuable social skills. Anne Case and Christina Paxson of Princeton University, on the other hand, argue that people who grow to their full potential are smarter, on average. Both brains and build depend on the care and nourishment a child receives.

Height adds to income, income also adds to height. In countries languishing at a real income of \$4,000 per head (in 1985 dollars), boys average less than 145cm. In places that are \$6,000 a head richer, boys are 4cm taller, according to calculations by Richard Steckel of Ohio State University. Likewise, Angus Deaton of Princeton University reports that Indian men of 20 are about 1cm taller than 40-year olds, partly because the country was substantially richer when they were born. In India adults still look up to their parents. But only figuratively.

The relationship between dollars and inches is not, however, straightforward. Uganda, for example, is both poorer and taller than India, where almost half of children under five are stunted, according to United Nations figures. Americans born in the 1880s, as the country's industrial revolution gathered pace, were both richer and shorter than their forebears.

What explains these enigmas? Height rises with prosperity, but at a diminishing rate. It traces an arc, not a straight line, as income increases. Otherwise, Mr Steckel points out, Bill Gates would be a giant. Earning enough to buy plentiful calories and protein makes a big difference to stature. But once a person has enough money to free himself from thin gruel and hard labour, extra income has less to add. "Stature," Mr Steckel writes, "is a good measure of deprivation but not of opulence."

Tall men are created equal

This arc has an interesting implication: the stature of society may reflect equality as well as prosperity. Extra resources add more to poor people's growth than they add to rich people's. So if two societies, with the same income per head, were to line up next to each other, the more egalitarian society should be taller.

This may be one explanation among many for the shrinking America of the 19th century. Tax records show that wealth gaps widened in America as industrialisation took hold. From 1820 to 1900, the Gini coefficient (a standard measure of inequality) in Massachusetts rose by 24%, according to Mr Steckel. Even as average heights fell, the stature of senior students at Yale and Amherst rose from 171cm to 173cm.

In India the starkest divisions are sometimes within the household. Indian women tend to have less clout than their African counterparts. Their claim on a family's resources may be weak, even as the demands made on them are heavy. Many women are consequently underfed or overworked during pregnancy. Their offspring, especially their daughters, are also undernourished during infancy. India may be growing taller as it grows richer. But, Mr Deaton shows, the average height of Indian men is rising three times faster than that of Indian women.

Some Indians deny this enigma, writes Meera Shekar of the World Bank. If Indians fall short of standard heights, they say, those standards must be an alien imposition, based on foreign populations. But the genetic differences between populations count for much less than the genetic differences within them. The grandchildren of American immigrants, for example, reach similar statures, whatever their ancestry. James Tanner, a giant among growth scholars, puts it this way: the great variation in human height, he writes, is "not a curve of God's errors, but of everyone's possibilities."