

# Nurture genius in developing countries

January 28 2019, by Andy Dunne

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The world is missing out on breakthrough science because exceptionally talented young people from low- and middle-income countries do not receive appropriate levels of support to help nurture their genius, according to a new study.

Published as an IMF Working Paper, the research, by Ruchir Agarwal (IMF) and Patrick Gaule (University of Bath) sheds light on the importance of encouraging exceptionally talented young people to

pursue scientific careers, especially those from lower income countries.

Focusing on the International Mathematics Olympiads – a prominent global competition for the brightest high school students – the authors compare and contrast the trajectories of 4,700 participants from different countries.

They find that small differences in talent are associated with sizeable differences in long-term achievements, including obtaining a Ph.D., number of publication, or being awarded a Fields Medal – the most prestigious award for leading mathematicians under the age of 40.

Yet this relationship does not hold equally across countries, with equally-talented individuals from poorer countries producing much less knowledge over their lifetime. For example, on average an Olympiad from a low-income country produces 35% fewer publications compared to an equally-talented Olympiad from a high-income country.

The authors of the paper suggest there are important implications both for developing countries and the wider world on failing to capitalise on the potentials of highly talented individuals. They estimate that the rate of global knowledge production could increase by 10% or more if the 'invisible geniuses' from the developing world were fully integrated in the world of science.

They also suggest the chance of making ground-breaking discoveries in fields like mathematics could be much higher—given that half of all Fields medallists since 1990 were Olympiad medallists when they were teenagers.

Dr. Patrick Gaule, of our Department of Economics explained: "When the knowledge frontier advances everybody benefits, but producing frontier knowledge is incredibly difficult. Our study highlights that a

small number of exceptionally talented individuals have a particularly good chance of producing such knowledge.

"Yet a significant share of the world pool of exceptional talent is underutilised. Simple and relatively inexpensive policies could address that."

Co-author, Ruchir Agarwal, added: "Ensuring that exceptionally-talented youth from around the world are not lost to the world of science is not only important for creating equal opportunity for all, but can also yield great benefits for all by pushing the frontier of human knowledge."

The researchers suggest that their findings should be useful for governments, philanthropists, universities and other organisations that seek to facilitate the production of frontier [knowledge](#).

They point to various programmes that could be used to better utilise exceptional talent, including new fellowships that make further science and maths study and careers more attractive; encouraging top schools doing more to incentivise applications from developing countries; and improving maths and [science](#) research training capacity within developing countries.

**More information:** Invisible Geniuses: Could the Knowledge Frontier Advance Faster? [www.imf.org/en/Publications/WP... Advance-Faster-46383](http://www.imf.org/en/Publications/WP...Advance-Faster-46383)

Provided by University of Bath

Citation: Nurture genius in developing countries (2019, January 28) retrieved 6 May 2024 from <https://phys.org/news/2019-01-nurture-genius-countries.html>

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