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# IMF Working Paper

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Invisible Geniuses: Could the Knowledge Frontier  
Advance Faster?

by Ruchir Agarwal and Patrick Gaule

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I N T E R N A T I O N A L M O N E T A R Y F U N D

**IMF Working Paper**

Asia and Pacific Department

**Invisible Geniuses: Could the Knowledge Frontier Advance Faster?**

Prepared by Ruchir Agarwal and Patrick Gaule

Authorized for distribution by Tarhan Feyzioglu

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**Abstract**

The advancement of the knowledge frontier is crucial for technological innovation and human progress. Using novel data from the setting of mathematics, this paper establishes two results. First, we document that individuals who demonstrate exceptional talent in their teenage years have an irreplaceable ability to create new ideas over their lifetime, suggesting that talent is a central ingredient in the production of knowledge. Second, such talented individuals born in low- or middle-income countries are systematically less likely to become knowledge producers. Our findings suggest that policies to encourage exceptionally-talented youth to pursue scientific careers—especially those from lower income countries—could accelerate the advancement of the knowledge frontier.

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# Invisible Geniuses: Could the Knowledge Frontier Advance Faster?\*

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## Abstract

The advancement of the knowledge frontier is crucial for technological innovation and human progress. Using novel data from the setting of mathematics, this paper establishes two results. First, we document that individuals who demonstrate exceptional talent in their teenage years have an irreplaceable ability to create new ideas over their lifetime, suggesting that talent is a central ingredient in the production of knowledge. Second, such talented individuals born in low- or middle-income countries are systematically less likely to become knowledge producers. Our findings suggest that policies to encourage exceptionally-talented youth to pursue scientific careers—especially those from lower income countries—could accelerate the advancement of the knowledge frontier.

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