GLOBAL TALENT FUND

MEDAL FACTORIES: WHY DO SOME COUNTRIES OUTPERFORM IN SPORTS AND SCIENCE?

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ABSTRACT

This paper studies the determinants of elite performance in international Science Olympiads and Olympic sports, focusing on the roles of population size and income. It finds three main results. First, population and income explain about 50% of the variation in country performance across both science and sports competitions. Second, several countries, particularly in Africa and the Middle East, consistently underperform their predicted rankings, indicating that other factors may play a crucial role in fostering elite talent. Third, there is a moderately high correlation between performance in the Science Olympiads and the Summer Olympics, suggesting that common and deeper, unexplained influences drive success across both domains. Overall, our results suggest that there is significant scope for several developing countries to improve how they utilize their talent pools. Future work needs to explore why this underperformance is concentrated in certain regions, with the explanation likely lying in factors beyond traditional economic indicators.

Keywords

Olympiads, Olympics, economics of talent, talent economics, human capital, education and growth, cross-country comparisons

JEL Codes

I23, J24, O47, L83

1 Introduction

Understanding country performance in the International Math Olympiad (IMO) is important, as it reflects national education quality, investment in STEM, and opportunities for international collaboration. Countries excelling in the IMO demonstrate strong educational frameworks, effective training for gifted students, and a commitment to developing mathematical talent from an early age.

Several papers have studied the IMO performance of individuals in different countries and its impacts. For example, Henseke (2009) and Canellidis and Sofianopoulou (2022) showed country differences in IMO performance. Recently, Yuret (2024) studied the career paths of IMO medalists from 1986 to 2005, finding that their home country significantly influences their career paths and that there is a high concentration of medalists pursuing education and careers abroad.

This paper examines the performance and outcomes of countries participating in the IMO over time. A comprehensive dataset of participants from the IMO is leveraged, with data on their subsequent career outcomes meticulously hand-collected. Agarwal and Gaulé (2020) and Agarwal et al. (2023) utilized the IMO dataset to document the relationship between the performance in the IMO with the production of mathematics knowledge and U.S. immigration. Adding to this, the focus here is on studying changes in country rankings and the subsequent academic outcomes of participants. The goal is to identify countries that have made significant improvements and quantify the extent of their progress and impacts.

The investigation begins with an analysis of trends in country rankings based on IMO performance from the early 2000s to the 2020s. Findings show that while many countries in the middle and bottom groups experienced movements across performance categories, breaking into the top-performing group remained challenging. Few countries managed to elevate from the middle to the top group, and none from the bottom in the 2000s reached the top third by the 2020s. To illustrate these dynamics, six countries — Cuba, Georgia, Saudi Arabia, Sri Lanka, the Philippines, and Tunisia — are selected to examine their performance trajectories in the IMO and the academic outcomes of their participants. The analysis presents improvements in Olympiad achievements and personal outcomes in the Philippines and Saudi Arabia, contrasting with Cuba's decline and the stability observed in the other countries. Lastly, the impact of Olympiad improvements on participants' academic trajectories, including decisions to study abroad, attend Top 100 universities, and pursue Ph.D. degrees, are also examined. Advancements in IMO scores are found to influence these decisions over time, with higher-scoring participants showing a consistent preference for international education opportunities, although this trend has somewhat moderated in recent years.

1.1 The IMO

The IMO is a prestigious annual competition for high school students under 20, held since 1959. Participants, selected by their national federations based on regional and national competitions, travel to a different host city each year, with expenses covered by the host organization. Initially limited to Eastern European countries, the IMO now includes over 100 countries.

Each country can send up to six participants to solve six problems in geometry, number theory, algebra, and combinatorics, with a maximum score of 42 points. Medals are awarded based on total points, with slightly fewer than half of the participants receiving medals. Although the competition maintains a consistent process for problem creation and grading, there is a perception that it has become more difficult over time.

1.2 Data

Multiple data sources were combined to create the original dataset for this paper. The data on all IMO participants are extracted from the official IMO website (http://www.imo-official.org) and those who participated between 2000 and 2022 are selected. This dataset includes 8,181 individuals from 129 countries, providing information on the year, country, points scored, and type of medal obtained by each participant.

An individual academic outcomes dataset is then constructed for six case study countries — Cuba, Georgia, Saudi Arabia, Sri Lanka, the Philippines, and Tunisia. These countries were chosen to compare the academic outcomes of better performers with others, including countries with declines (Cuba), improvements (Saudi Arabia and the Philippines), and stable performance (Georgia, Sri Lanka, and Tunisia). Academic outcome variables are created by searching the names of IMO participants from these six countries online: Study Abroad, Top 100 University, and Ph.D. Degree. These variables are binary, indicating whether the individual has obtained or is pursuing an undergraduate degree abroad, is attending a Top 100 university (based on the Shanghai 2023 Academic Ranking of World Universities), or has achieved or is pursuing a Ph.D. degree. The dataset includes career information for 383 individuals from these six countries who participated in the IMO between 2000 and 2022.

2 Which countries showed improvement in the Olympiad?

This section analyzes whether there have been changes in countries' rankings in the IMO over time. The goal is to identify countries that have significantly improved and quantify the extent of their improvement.

Figure 1 shows scatter plots comparing country percentile ranks based on average scores of participants from the 2000-2004 period to subsequent periods, segmented by 5-year intervals, except

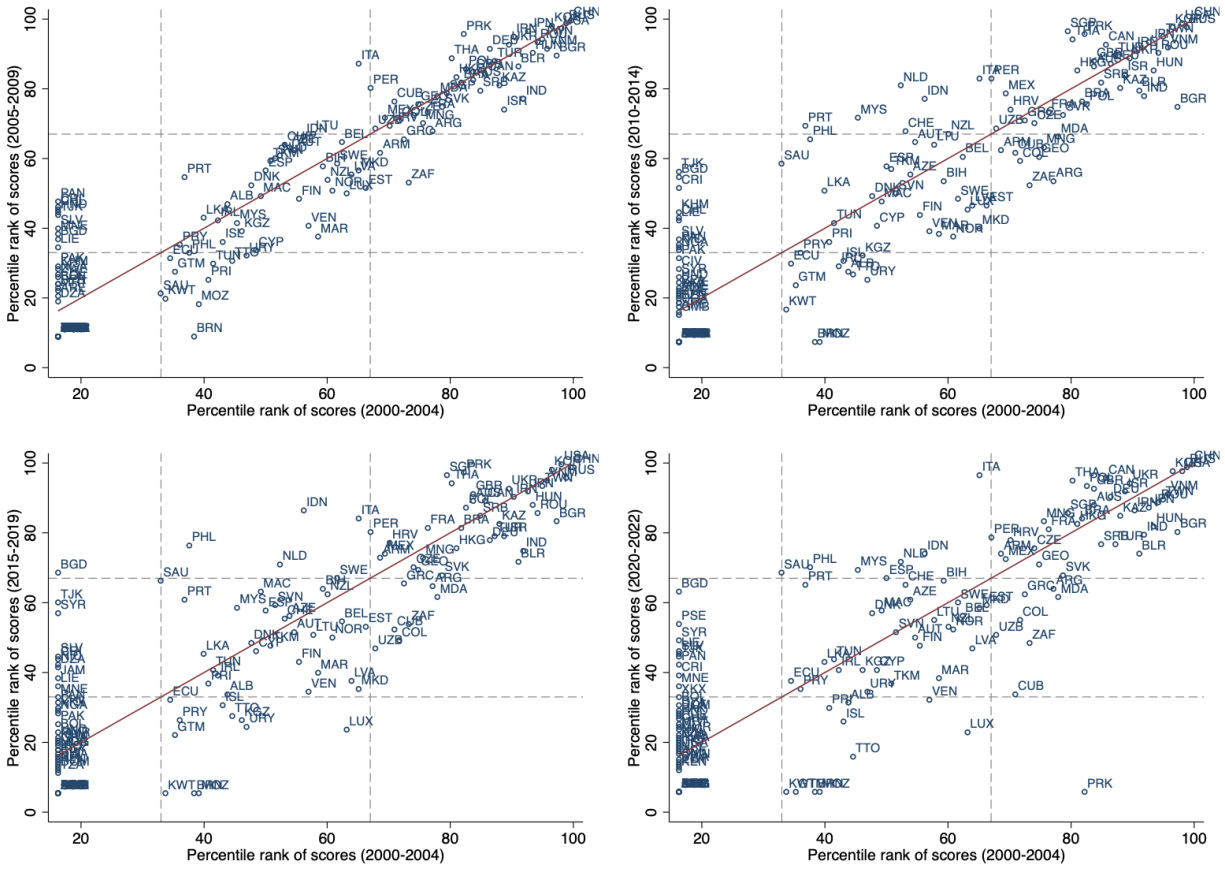

Figure 1: Country Percentile Rank Based on Average Scores of Participants

Notes: The figure presents scatter plots comparing country percentile ranks based on scores from the 2000-2004 period to ranks in subsequent periods. Starting from the top-left panel, the plots compare ranks from 2000-2004 to the following 5 years, the subsequent 5 years, 15 years later, and the most recent 3 years from 2020 to 2022. All countries participating at least once throughout the entire sample period are included. In instances of missing values for countries in specific periods, zero scores are assumed. The percentile rank from the previous 5 years is taken for Noth Korea in the 2000-2004, for consistency.

Table 1: Performance Persistency

	2020-2022		
	Bottom	Middle	Top
2000-2004			
Bottom	59.3%	40.7%	0%
Middle	39.3%	50%	10.7%
Top	0%	11.1%	89%

Notes: The table presents how many countries from the bottom, middle, and top thirds in the 2000-2004 period shifted to different groups or remained in the same group during 2020-2022. Out of 82 participating countries, "%Change" denotes the percentage of original bottom/middle/top group countries that moved or stayed within their respective groups. The total number of countries in each group is 27, 28, and 27 respectively for the Bottom, Middle, and Top categories.

for the final period which covers 3 years. In the initial panel, spanning from 2000-2004 to 2005-2009, there were no significant changes observed in country ranks, except for countries that first participated in the 2005-2009 period, with a tightly clustered upward trend suggesting stability within ranking groups over a decade. However, in the following decades, particularly in the 2020s, larger variations, especially among middle and bottom thirds of countries, appear. Many top third countries consistently maintained their positions within the group, while more movements were observed between bottom and middle thirds. An entry barrier into the top third with high scores was observed, as no country from the bottom group in 2000-2004 advanced to the top third in 2020-2022.

Table 1 and 2 details the transitions of countries from bottom, middle, and top thirds in the 2000-2004 period to different groups by 2020-2022. The tables consider countries that participated in the 2000-2004 period only. Consistent with the trends in Figure 1, none of the bottom group countries progressed to the top third, while only 10.7% of middle group countries, such as France, Italy, and Mongolia, advanced to the top group. Approximately 59.3% and 50% of bottom and middle group countries, respectively, remained within their respective groups, with 89% of top group countries retaining their positions. Only three countries, including Belarus, Slovakia, and Turkey, descended to the middle group during the 2020-2022 period.

Table 3 presents descriptive statistics for the sample countries in the earlier period (2000-2010) compared to the later period (2011-2022). Overall, the average scores increased from 13.9 to 14.6, and the number of awarded medals increased from 3.8 to 4.2 per country, with similar variances of around 8 and 2, respectively. This may be attributed to the expansion of the Olympiad competition itself.

Table 2: Performance Groups Over Time

From (2000-2004)	To (2020-2022)	Countries
Bottom	Bottom	Albania, Austria, Cyprus, Ecuador, Finland, Iceland, Ireland, Kyrgyzstan, Paraguay, Puerto Rico, Slovenia, Sri Lanka, Trinidad and Tobago, Tunisia, Turkmenistan, Uruguay
	Middle	Azerbaijan, Denmark, Indonesia, Macao, Malaysia, Netherlands, Philippines, Portugal, Saudi Arabia, Spain, Switzerland
	Top	-
Middle	Bottom	Colombia, Cuba, Latvia, Lithuania, Luxembourg, Morocco, New Zealand, Norway, South Africa, Uzbekistan, Venezuela
	Middle	Argentina, Armenia, Belgium, Bosnia and Herzegovina, Croatia, Czech Republic, Estonia, Georgia, Greece, Macedonia, Mexico, Moldova, Peru, Sweden
	Top	France, Italy, Mongolia
Top	Bottom	-
	Middle	Belarus, Slovakia, Turkey
	Top	Australia, Brazil, Bulgaria, Canada, China, Chinese Taipei (Taiwan), Germany, Hong Kong, Hungary, India, Iran, Israel, Japan, Kazakhstan, Poland, Romania, Russia, Singapore, South Korea, Thailand, Ukraine, United Kingdom, United States, Vietnam

Notes: The table presents which countries from the bottom, middle, and top thirds in the 2000-2004 period shifted to different groups or remained in the same group during 2020-2022.

Table 3: Descriptive Statistics

		Mean	Median	Std. Dev.	Min	Max	Obs.
Average scores	*Earlier years*	13.9	12.5	8.3	0	39.2	989
	Later years	14.6	13.8	8.5	0	42	1,259
# Medals	*Earlier years*	3.8	4	2.1	0	6	989
	Later years	4.2	5	2.1	0	6	1,259

Notes: "Earlier years" refers to the period from 2000 to 2010, while "Later years" denotes the period 2011-2022. The statistics are at the country level.

3 Case Studies: Six Selected Countries

Now let's focus on six selected countries — Cuba, Georgia, Saudi Arabia, Sri Lanka, the Philippines, and Tunisia — to compare the performance and participants' outcomes of those that experienced significant improvement, decline, or remained relatively stable over time. This section analyzes how these countries experienced changes in their average scores and ranks in the IMO across time, along with their participants' personal academic outcomes.

Figure 1 shows that the Philippines and Saudi Arabia transitioned from the bottom to the middle group, implying significant improvement in percentile rank changes.[1] In contrast, Cuba experienced the most substantial decline in performance, moving from the middle group to the bottom. Meanwhile, Georgia stayed in the middle group, and Sri Lanka and Tunisia remained in the bottom group from the 2000-2004 to the 2020-2022 period. These six countries are used to analyze the impact of performance changes on participants' outcomes in the IMO.

Figure 2 presents time-series data of countries' percentile ranks, derived from the average scores and ranks of their participants. The left-hand-side panels show countries that experienced notable changes in their performance in the IMO. On the top row, Cuba experienced a rapid decline in scores, especially after 2010, from above the 80th percentile to below the 40th, while the Philippines and Saudi Arabia showed increases in percentile ranks since the late 2000s. The right-hand-side panels show countries that remained relatively consistent over time, including Georgia, Sri Lanka, and Tunisia. These three countries stayed consistent over time, with Georgia remaining in the middle third percentile rank and Sri Lanka and Tunisia staying in the bottom third group. From now on, I will refer to Cuba as a Decliner, the Philippines and Saudi Arabia as *Improvers*, and the other three as Steadies.

Based on the time-series observations in Figure 2, the sample period is divided into earlier and later periods, defined differently for each country. For Cuba, the period is divided into two with the 2010 cutoff, as a rapid decline is observed in the 2010s. The 2000-2008 period is defined as the earlier period and the 2009-2022 period as the later period for the Philippines, Saudi Arabia, and Sri Lanka. The earlier and later periods are defined to be 2000-2016 and 2017-2022 for Tunisia. For Georgia, the earlier period is 2000-2015.[2] Figure 3 visualizes the changes in percentile ranks based on the average score of participants for these countries. Consistent with Figure 2, noticeable changes in the rankings of Cuba, the Philippines, and Saudi Arabia are observed, while the changes are smaller for the *Steadies*.

Figure 4 compares the Improvers, which experienced significant Olympiad achievements, with Sri Lanka and Tunisia, which showed more moderate progress. All four countries started in the bottom third group in the early 2000s, facilitating a direct comparison. The top row of the figure

[1] The appendix contains figures illustrating changes in percentile ranks based on total scores in the IMO.

[2] This allows for the comparison of personal outcomes in the earlier and later periods, as participants' information starts in 2011 for Georgia.

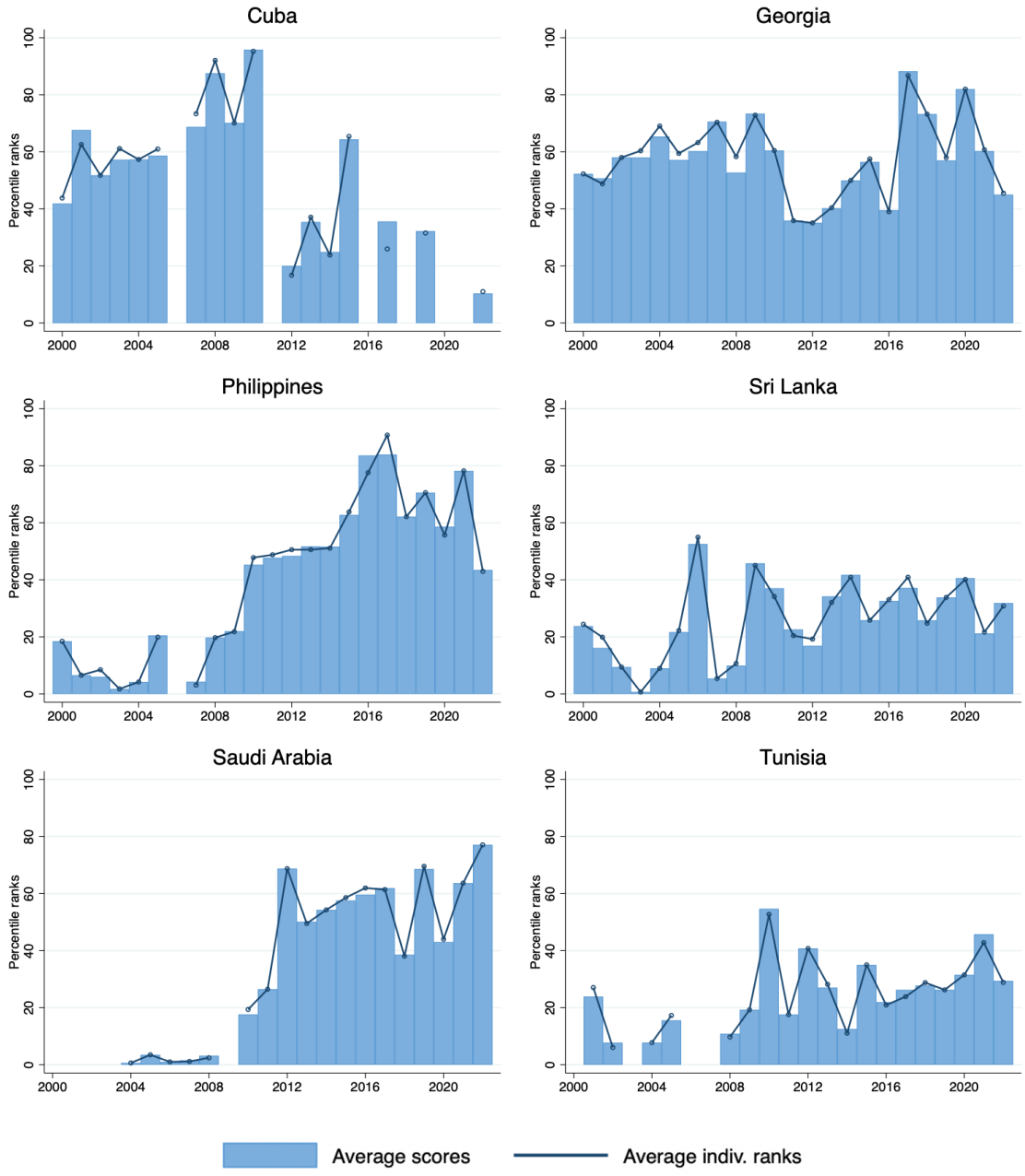

Figure 2: Average Scores and Ranks Over Time for Six Selected Countries

Notes: The figure depicts time-series data of countries' percentile ranks derived from average scores and ranks of their participants. Percentile ranks based on individual ranks are computed using inverse ranking, where 100 percentile corresponds to rank 1. Missing values in certain years indicate no participants during those periods.

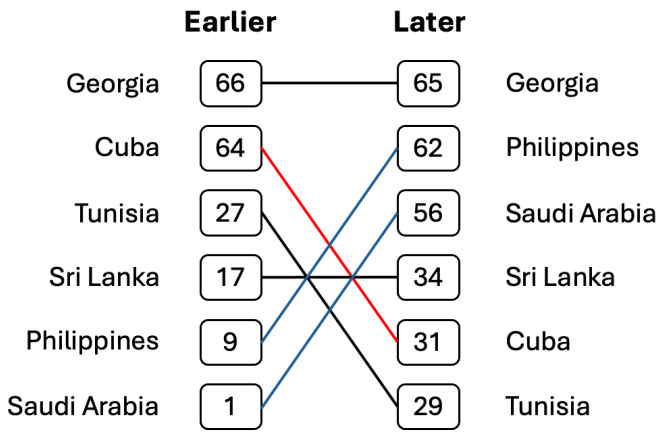

Figure 3: Percentile Ranks in Earlier and Later Periods

shows that average scores increased from 2.9 to 16.2 in the Philippines and Saudi Arabia, compared to an increase from 6.7 to 10.3 in Sri Lanka and Tunisia. Regarding the number of medals, the first two countries saw more than a tenfold increase, while the latter two showed about a twofold increase.

There was a 31.5 percentage point increase in participants from the Philippines and Saudi Arabia studying abroad for undergraduate studies, rising from 10.6% to 42.1%. In contrast, the increase was less pronounced in Sri Lanka and Tunisia, from 18.3% to 23.9%. The percentage of students attending Top 100 universities increased by 18.5 percentage points in the first two countries, compared to a rise of approximately 2.4 percentage points in the other two, possibly suggesting a preference among higher-scoring IMO participants for international over domestic educational opportunities.

To further confirm the changes in countries' performance in the IMO regarding their scores and number of medals, Table 4 presents regression results illustrating the influence of the Later, Cuba, and Improvers dummy variables on these outcomes for each participant. The Later dummy variable is assigned a value of 1 if the period is after 2008 for the Philippines, Saudi Arabia, and Sri Lanka, after 2010 for Cuba, after 2015 for Georgia, and after 2016 for Tunisia, and 0 otherwise. The Decliner dummy variable indicates whether a participant is from Cuba (1 if yes, 0 otherwise), and the Improvers dummy variable indicates whether a participant is from the Philippines or Saudi Arabia (1 if yes, 0 otherwise).

The table shows that both scores and the number of medals tend to increase in the later period, possibly due to enhanced standardization and the expansion of the competition, as well as improved training in each country. Notably, the *Improvers* showed significant improvement, as evidenced by the positive and significant coefficients in columns (2) and (4), suggesting that these countries invested in training students to achieve better outcomes in the IMO. However, Cuba experienced a

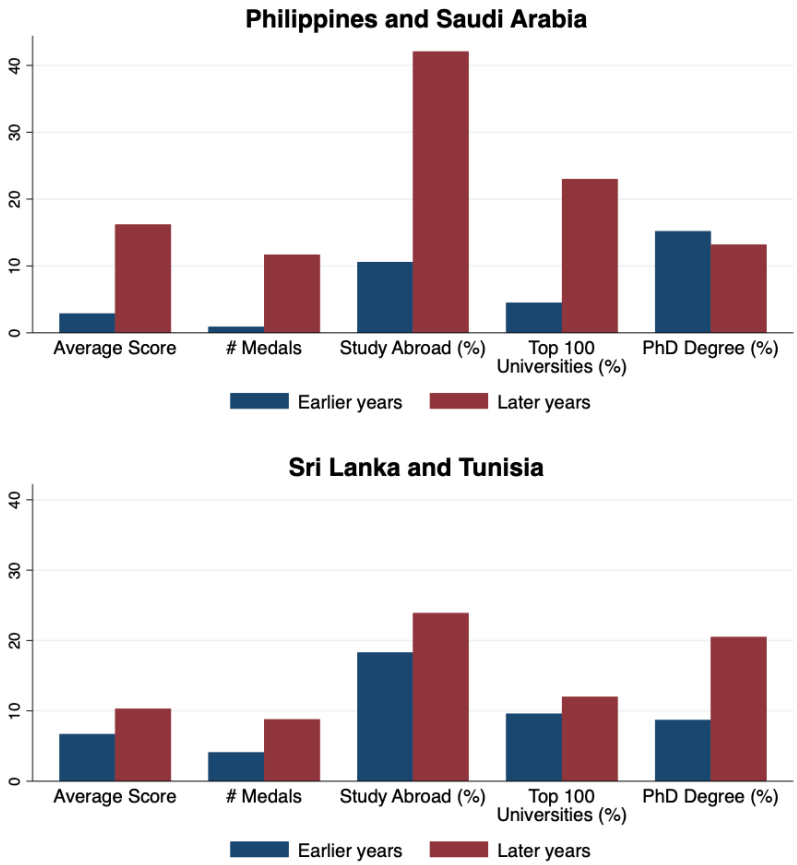

Figure 4: Olympiad Performance: Earlier vs. Later Periods

Notes: The figure compares various metrics between two groups: "Improvers" (the Philippines and Saudi Arabia) and "Steadies" (Sri Lanka and Tunisia) from a similar ranking group. These metrics include the average scores, the number of medals, the percentage of participants who studied abroad during their undergraduate periods, the percentage who attended Top 100 universities, and the percentage who pursued a Ph.D. degree. The comparison is made across earlier and later year periods, defined differently for each country.

Table 4: Factors that Affect Scores and the Number of Medals

	Score		# Medals	
	(1)	(2)	(3)	(4)
Later	6.69***	3.63***	0.43***	0.31***
	(0.61)	(0.75)	(0.05)	(0.06)
Later × Decliner		-5.42***		-0.43**
		(1.64)		(0.20)
Later × Improvers		9.06***		0.38***
		(1.09)		(0.09)
Country FE	Yes	Yes	Yes	Yes
Observation	383	383	383	383
R2	0.38	0.49	0.26	0.31
Mean(dept. variable)	10.2	10.2	0.6	0.6

Notes: The dependent variables are "Score," which refers to the average total score each individual received from the Olympiad, and "# Medals," which denotes the number of medals obtained by the individual. "Later" dummy variable is assigned a value of 1 if the period is after 2008 for the Philippines, Saudi Arabia, and Sri Lanka, after 2010 for Cuba, after 2015 for Georgia, and after 2016 for Tunisia, and 0 otherwise. The "Decliner" and "Improvers" variables are assigned a value of 1 if the country is Cuba, and the Philippines or Saudi Arabia, respectively, and 0 otherwise. *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$.

decline in both scores and the number of medals in the later period, consistent with the observations in Figures 2 and 3.

Table 5 presents similar regression results but focusing on participants' academic outcomes, focusing on three key factors: studying abroad, attending Top 100 universities, and pursuing a Ph.D. degree. "Studying abroad" refers to students pursuing undergraduate degrees in foreign countries, "Attending Top 100 universities" indicates students enrolled in or graduated from universities ranked in the Top 100 according to the Shanghai Ranking, and "Pursuing a Ph.D. degree" pertains to students actively pursuing or having obtained a Ph.D. degree. The table shows that students who participated in later periods are more likely to study abroad. Consistent with the observation in Figure 4, the Improvers experienced further increases in students pursuing undergraduate degrees in foreign universities and/or attend Top 100 universities. Since no students from both earlier and later periods study abroad and attend Top 100 universities in Cuba, coefficients on "Later × Decliner" in columns (2) and (4) are not significant.

4 Values of Training: Impacts of improvement in Olympiad

This section explores the impact of Olympiad improvements on participants' academic outcomes. Table 6 presents regression results examining the effects of Olympiad achievements on personal academic outcomes. The analysis specifically focuses on how participants' scores and the year of

Table 5: Factors that Affect Academic Outcomes

	Study Abroad		Top 100 University		Ph.D. Degree	
	(1)	(2)	(3)	(4)	(5)	(6)
Later	0.10**	0.03	0.03	-0.01	-0.04	0.004
	(0.04)	(0.06)	(0.03)	(0.03)	(0.03)	(0.03)
Later × Decliner		-0.03		0.01		-0.37***
		(0.06)		(0.03)		(0.11)
Later × Improvers		0.18**		0.11*		-0.04
		(0.09)		(0.06)		(0.07)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observation	383	383	383	383	383	383
R2	0.10	0.11	0.06	0.06	0.08	0.10
Mean(dept. variable)	0.19	0.19	0.06	0.06	0.11	0.11

Notes: The dependent variables are indicators for Study Abroad, Top 100 University attendance, and Ph.D. Degree attainment. These variables are set to 1 if the individual has obtained or is pursuing an undergraduate degree in a foreign university, attending a Top 100 university, or has achieved a Ph.D. degree, respectively, and 0 otherwise. "Later" dummy variable is assigned a value of 1 if the period is after 2008 for the Philippines, Saudi Arabia, and Sri Lanka, after 2010 for Cuba, after 2015 for Georgia, and after 2016 for Tunisia, and 0 otherwise. The "Decliner" and "Improvers" variables are assigned a value of 1 if the country is Cuba, and the Philippines or Saudi Arabia, respectively, and 0 otherwise. *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$.

participation influence their decisions to study abroad, attend Top 100 universities, and pursue a Ph.D. degree. To understand how academic outcomes vary for participants with higher scores over time, a difference-in-difference analysis is applied, by including the interaction term *Score* × *Year*.

Column (2) shows that participants with higher scores in the IMO are more likely to pursue a Bachelor's degree at foreign universities, although this effect slightly diminishes over time. This trend reflects the increasing globalization, with more students choosing to study abroad for their undergraduate studies overall. For top students, the diminishing impact of high IMO scores on the decision to study abroad may be due to the growing availability of good opportunities domestically. Similar findings are observed in column (4) regarding attendance at Top 100 universities, with positive and significant coefficients on scores and a negative significant coefficient on the interaction term, suggesting that while higher-scoring students still went to top-ranked universities, this phenomenon weakens over time.

In column (5), there is a significant negative impact of the year variable on the likelihood of participants pursuing a Ph.D. degree, indicating a decreasing trend in pursuing advanced academic degrees over the study period. This decline is logical as many participants in later years may not yet have completed their Bachelor's degrees. Column (6) shows an initially insignificant coefficient on scores, which is attributed to the significant dampening effect of the year variable. However, upon reaching appropriate age and academic stage, high-scoring participants indeed show increased

Table 6: Impacts of Olympiad Achievements on Academic Outcomes

	Study Abroad		Top 100 University		Ph.D. Degree	
	(1)	(2)	(3)	(4)	(5)	(6)
Score	0.01*	2.05***	0.002	1.17**	0.0004	1.56***
	(0.003)	(0.86)	(0.002)	(0.59)	(0.003)	(0.52)
Year	0.003	0.01**	0.001	0.01**	-0.004*	0.004
	(0.003)	(0.005)	(0.002)	(0.003)	(0.002)	(0.003)
Score × Year		-0.001**		-0.001**		-0.001***
		(0.0004)		(0.0003)		(0.0003)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observation	383	383	383	383	383	383
R2	0.10	0.12	0.03	0.04	0.09	0.10
Mean(dept. variable)	0.19	0.19	0.06	0.06	0.11	0.11

Notes: The table presents regression results with country fixed effects. "Score" refers to the average total score each individual received from the Olympiad. The dependent variables are indicators for Study Abroad, Top 100 University attendance, and Ph.D. Degree attainment. These variables are set to 1 if the individual has obtained or is pursuing an undergraduate degree in a foreign university, attending a Top 100 university, or has achieved a Ph.D. degree, respectively, and 0 otherwise. *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$.

likelihood of pursuing a Ph.D. degree.

5 Conclusion

This paper provided an analysis of the performance and outcomes of countries in the IMO, using a unique dataset that tracks the career outcomes of participants. By examining cross-country data with a focus on six case study countries, several findings are uncovered.

First, I find that country rankings in the IMO are highly persistent, with 90% of the countries in the top third remaining there after 20 years. However, this stability does not imply immobility. Around 10.7% of countries in the middle group, such as France, Italy, and Mongolia, moved up to the top third, and 40% of countries in the bottom group, including the Philippines and Tunisia, improved to the middle third over the same period. Moreover, among the countries that showed improvement, the later cohorts showed more likelihood of achieving higher scores, winning medals, pursuing undergraduate education abroad, and attending Top 100 universities. These trends suggest that enhanced performance in the IMO might be linked not only to educational achievement but also to broader educational developmental opportunities, such as international mobility and access to high-quality institutions.

Overall, these findings attempt to offer insights into how countries can harness improved performance in international academic competitions like the IMO to achieve broader educational and developmental objectives. Countries that succeed in advancing their IMO performance

may benefit from enhanced global recognition, increased opportunities for their youth in higher education, and potential long-term gains in human capital development. Future research can explore the specific strategies and policies that have enabled certain countries to climb the ranks, particularly those that have moved from lower to higher performance tiers. Understanding these mechanisms could help other nations design effective interventions to support their own educational and developmental goals. Furthermore, investigating the long-term impacts of such improvements on national educational systems and economic growth could provide deeper insights into the broader significance of international academic competitions.

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Appendix

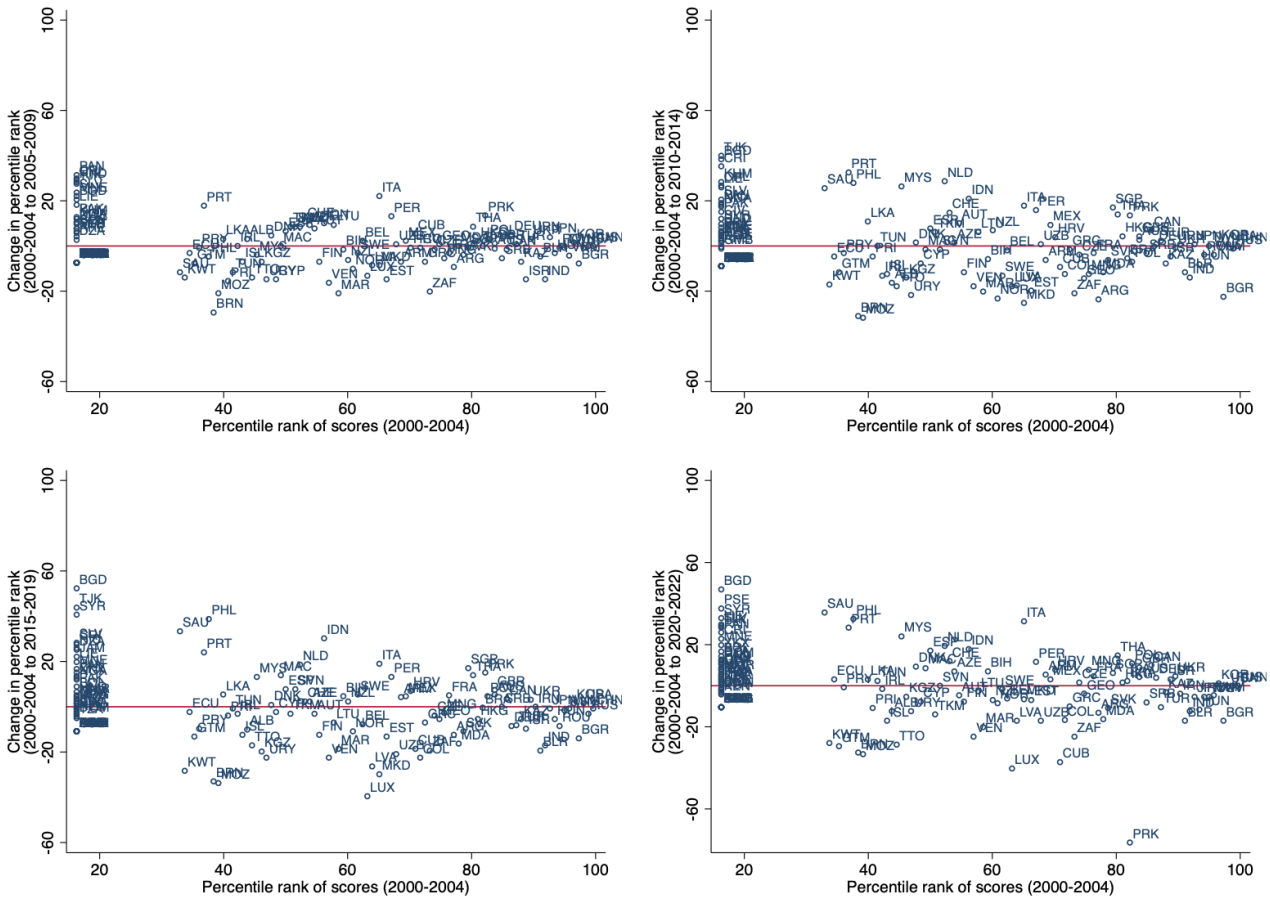

Figure A.1: Changes in Country Percentile Rank Based on Average Scores of Participants

Note: The figure presents scatter plots comparing changes in country percentile ranks based on scores from the 2000-2004 period to ranks in subsequent periods. Starting from the top-left panel and moving clockwise, the plots show changes in ranks from 2000-2004 to the following 5 years, the subsequent 5 years, 15 years later, and the most recent 3 years from 2020 to 2022. All countries participating at least once throughout the entire sample period are included. In instances of missing values for countries in specific periods, zero scores are assumed. The percentile rank from the previous 5 years is taken for North Korea in the 2000-2004 period, for consistency.

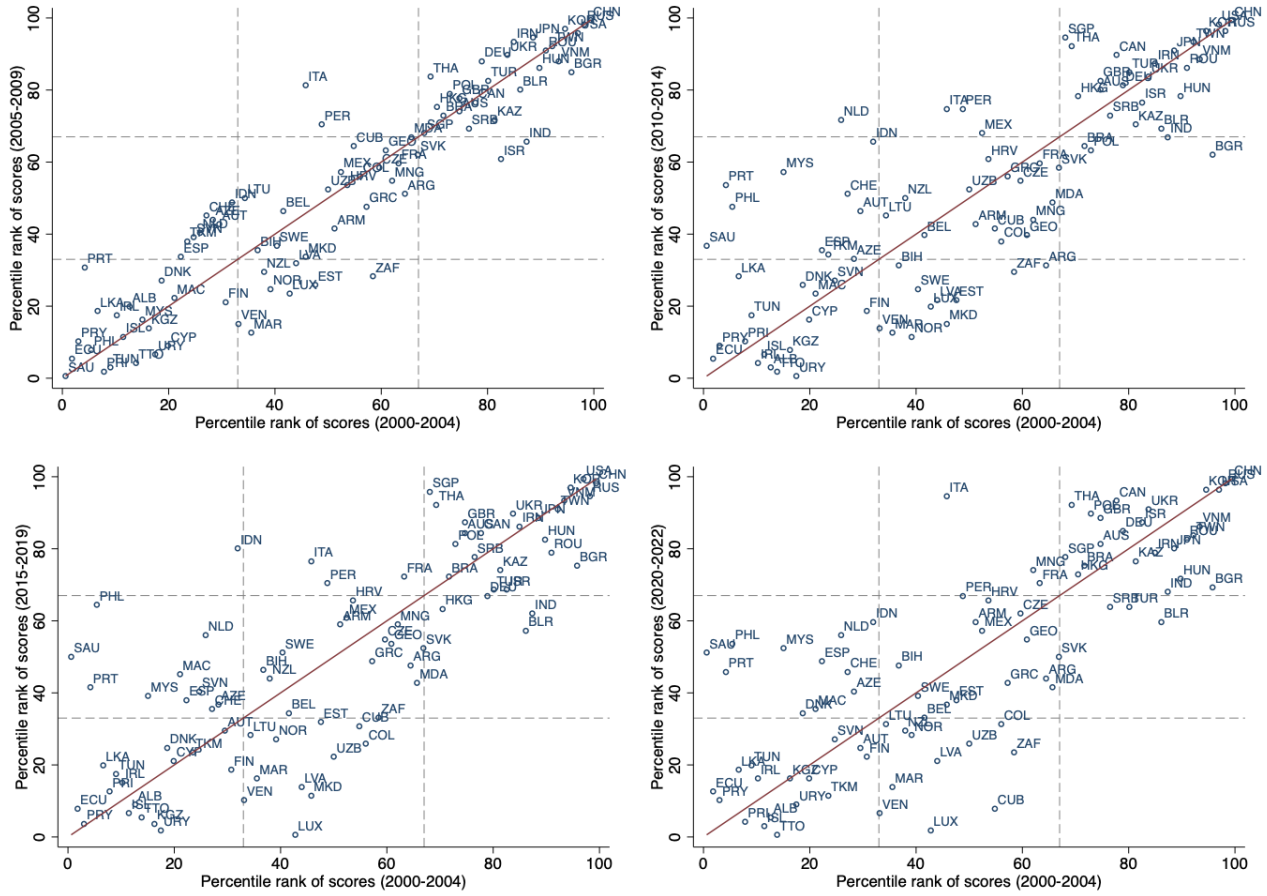

Figure A.2: Country Percentile Rank Based on Average Scores of Participants

Note: The figure presents scatter plots comparing country percentile ranks based on scores from the 2000-2004 period to ranks in subsequent periods. Starting from the top-left panel and moving clockwise, the plots compare ranks from 2000-2004 to the following 5 years, the subsequent 5 years, 15 years later, and the most recent 3 years from 2020 to 2022. The focus is on countries that participated in the Olympiad for all the four periods.

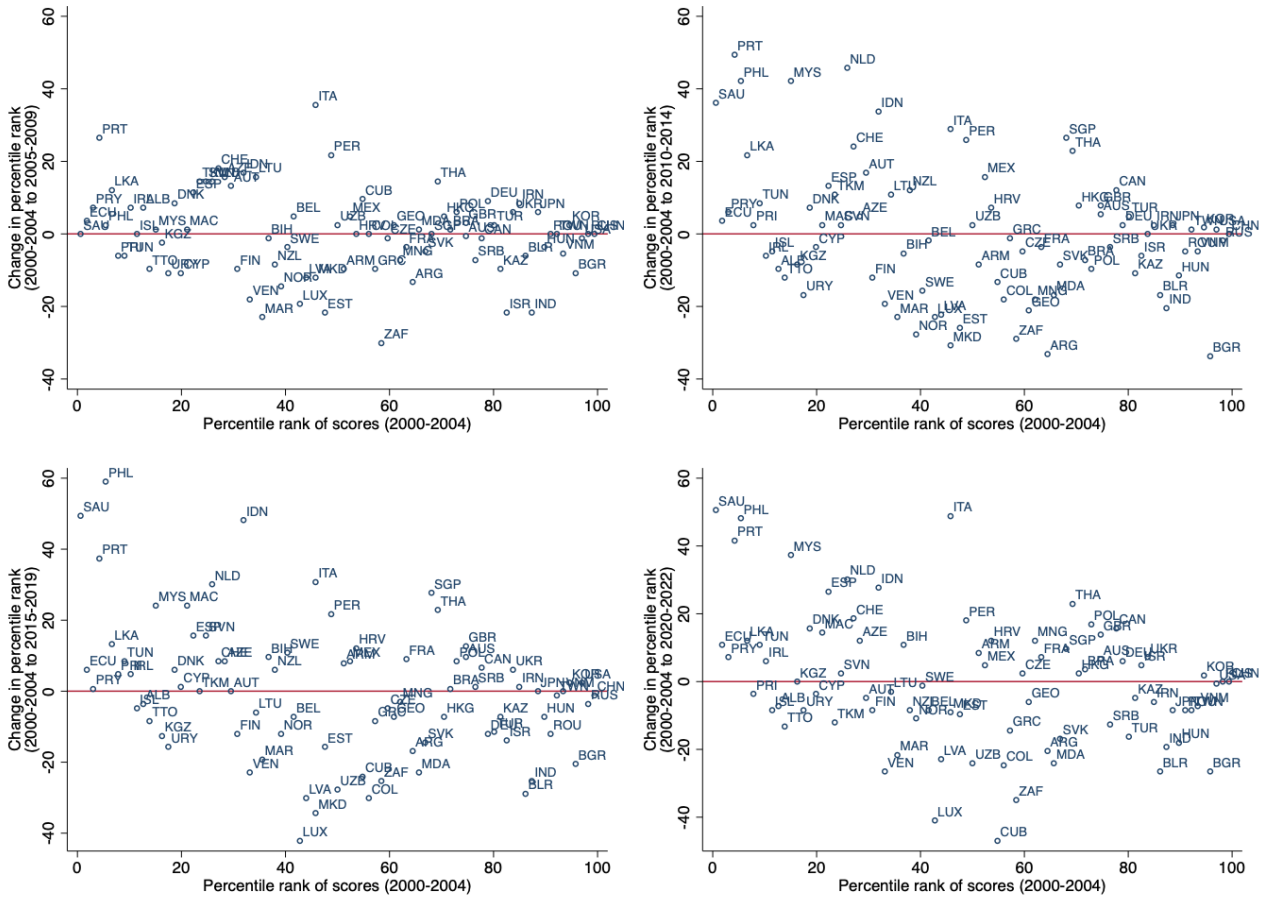

Figure A.3: Changes in Country Percentile Rank Based on Average Scores of Participants

Note: The figure presents scatter plots comparing changes in country percentile ranks based on scores from the 2000-2004 period to ranks in subsequent periods. Starting from the top-left panel and moving clockwise, the plots show changes in ranks from 2000-2004 to the following 5 years, the subsequent 5 years, 15 years later, and the most recent 3 years from 2020 to 2022. The focus is on countries that participated in the Olympiad for all the four periods.