

# COMPETITIVE BALANCE AND MEDAL DISTRIBUTIONS AT THE SUMMER OLYMPIC GAMES 1992-2016: OVERALL AND GENDER-SPECIFIC ANALYSES

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## ABSTRACT

This article examines competitive balance at the Summer Olympic Games between 1992 and 2016 by measuring the distribution of gold medals, medals and medal points amongst nations, for overall and male and female competitions. The key findings are overall; there has been no improvement in competitive balance since the 1992 Olympics. There is some evidence that competitive balance has improved in male competitions, as shown by decreased HHIN, CV and CR4 values. The analysis of female competitions suggests that competitive balance has remained largely unchanged. However, the CV Gold indicator provides evidence of a significant decline in competitive balance. The findings facilitate a more evidence-based evaluation of existing policy measures and strategies, and their refinement where appropriate. Policy suggestions are proffered for the International Olympic Committee (IOC) and various International Federations (IFs), and non-major nations to promote a more balanced development and competition particularly for women.

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## HIGHLIGHTS

The research uses five indicators of competitive balance – a normalised version of the Herfin-dahl-Hirschman Index (HHIN); proportion of gold medal-winning nations (PGMWN) and pro-portion of medal-winning nations (PMWN); coefficient of variation (CV) in nations' market share; and two types of concentration ratios (CR). When used in combination, these indicators provide a comprehensive examination of competitive balance at the most recent Summer Olympic Games.

- For all competitions, it is apparent from [Tables 1 and 2](#) that there are no significant changes to HHIN, PGMWN, PMWN, CV or CR indicators between Barcelona 1992 and Rio de Janeiro 2016.
- For male-specific medal performances at the Summer Olympic Games during the period 1992–2016, all indicators again trended towards an increased competitive balance. For female competitions, according to [Table 1](#), there were no significant HHIN trends for female competitions.

# IMPLICATIONS

The lack of notable improvements in overall competitive balance, or even deterioration in female competitions should concern the IOC and the participating IFs.

- The IOC and some IFs have adopted various policy initiatives, for example, through financial support for less developed nations, and human resources.
- Competition format changes such as those introduced recently in shooting and archery that seek to undermine the traditional dominance of some nations in certain sports by increasing outcome uncertainty, could also be recommended to the IFs of other Olympic sports.
- Female events provide an opportunity for “medium” and below-medium nations to access more medals. This is particularly important in the context of the gender equity campaign of the IOC and the concomitant increased number of female sports, disciplines and events added to the Olympic repertoire.

Table 1. Trends in competitive balance at the seven most recent Summer Olympic Games: HHIN, P(G)MWN and CV results.

Gender	Edition	Normalised Herfindahl-Hirschman Index (HHN) (Rank)			Proportion of (Gold) Medal-Winning Nations (P(G)MWN) (Rank)		Coefficient of Variation (CV) (Rank)		
		Gold Medals	Medals	Medal Points	Gold Medals	Medals	Gold Medals	Medals	Medal Points
Overall	1992	0.079(7)	0.058(7)	0.064(7)	0.220 (7)	0.381 (8)	3.631 (7)	3.107 (7)	3.259 (7)
	1996	0.054(4)	0.039(5)	0.043(4)	0.270 (3)	0.403 (4)	3.240 (4)	2.771 (4)	2.891 (4)
	2000	0.049(2)	0.037(2)	0.040(1)	0.261 (6)	0.402 (3)	3.115 (2)	2.724 (1)	2.815 (1)
	2004	0.047(1)	0.039(3)	0.041(3)	0.280 (2)	0.379 (7)	3.069 (1)	2.771 (3)	2.852 (2)
	2008	0.061(5)	0.041(6)	0.045(6)	0.266 (4)	0.424 (1)	3.509 (5)	2.860 (8)	3.014 (6)
	2012	0.061(6)	0.039(4)	0.044(5)	0.265 (5)	0.417 (2)	3.520 (6)	2.827 (5)	3.005 (5)
	2016	0.050(3)	0.037(1)	0.040(2)	0.285 (1)	0.429 (2)	3.207 (3)	2.761 (2)	2.877 (1)
	corr.	-0.179	-0.571	-0.286	0.571	0.643	-0.179	-0.286	-0.179
	p	0.702	0.180	0.535	0.180	0.119	0.702	0.535	0.702
	Male	1992	0.083(7)	0.052(7)	0.060(7)	0.196 (7)	0.375 (3)	3.742 (7)	2.950 (7)
1996		0.055(6)	0.037(6)	0.041(6)	0.216 (6)	0.371 (5)	3.262 (5)	2.691 (5)	2.819 (6)
2000		0.046(2)	0.037(5)	0.039(5)	0.226 (5)	0.382 (6)	3.012 (1)	2.704 (6)	2.776 (5)
2004		0.046(3)	0.036(4)	0.038(4)	0.253 (1)	0.354 (7)	3.019 (2)	2.655 (4)	2.736 (3)
2008		0.053(5)	0.035(3)	0.038(3)	0.233 (4)	0.401 (1)	3.263 (6)	2.644 (2)	2.754 (4)
2012		0.048(4)	0.033(1)	0.036(1)	0.236 (2)	0.396 (2)	3.115 (4)	2.563 (1)	2.682 (1)
2016		0.045(1)	0.034(2)	0.036(2)	0.233 (3)	0.374 (4)	3.058 (3)	2.648 (3)	2.729 (2)
corr.		-0.679	-0.964	-0.964	0.750	0.286	-0.321	-0.857	-0.929
p		0.094	0.000	0.000	0.052	0.535	0.482	0.014	0.003
Female		1992	0.085(6)	0.077(7)	0.079(7)	0.173 (5)	0.271 (7)	3.355 (2)	3.208 (5)
	1996	0.065(3)	0.047(4)	0.051(4)	0.210 (1)	0.287 (5)	2.589 (1)	2.805 (1)	2.926 (1)
	2000	0.063(2)	0.043(1)	0.047(1)	0.174 (4)	0.311 (2)	3.453 (4)	2.850 (2)	2.973 (2)
	2004	0.061(1)	0.046(3)	0.050(2)	0.183 (3)	0.277 (6)	3.400 (3)	2.975 (3)	3.082 (3)
	2008	0.079(5)	0.055(6)	0.061(5)	0.165 (7)	0.384 (3)	3.920 (6)	3.280 (8)	3.429 (6)
	2012	0.090(7)	0.054(5)	0.063(6)	0.165 (6)	0.360 (4)	4.238 (7)	3.267 (7)	3.539 (7)
	2016	0.068(4)	0.045(2)	0.050(3)	0.188 (2)	0.327 (1)	3.696 (5)	3.023 (4)	3.191 (4)
	corr.	0.179	-0.288	-0.143	-0.143	0.679	0.821	0.464	0.464
	p	0.762	0.535	0.766	0.760	0.094	0.623	0.294	0.294

Notes: (1) Numbers in the parentheses indicate the ranking of each edition regarding the level of competitive balance. (2) All the figures are rounded to the third decimal place only.

Table 2. Trends in competitive balance at the seven most recent Summer Olympic Games: CR results.

Gender	Edition	Concentration Ratios of Top 4 Nations (CR4) (Rank)					
		Gold Medals			Medals		
		Gold Medals	Medals	Medal Points	Gold Medals	Medals	Medal Points
Overall	1992	0.504 (7)	0.437 (7)	0.460 (7)	0.754 (7)	0.643 (7)	0.675 (7)
	1996	0.391 (4)	0.331 (4)	0.352 (4)	0.629 (4)	0.555 (5)	0.572 (4)
	2000	0.377 (2)	0.321 (1)	0.338 (1)	0.583 (2)	0.525 (1)	0.542 (1)
	2004	0.375 (1)	0.328 (2)	0.343 (2)	0.575 (1)	0.530 (2)	0.542 (2)
	2008	0.427 (5)	0.345 (3)	0.365 (3)	0.649 (6)	0.585 (6)	0.586 (6)
	2012	0.452 (6)	0.349 (4)	0.377 (4)	0.645 (5)	0.545 (4)	0.577 (5)
	2016	0.384 (3)	0.322 (2)	0.341 (2)	0.593 (3)	0.531 (3)	0.548 (3)
	corr.	-0.179	-0.250	-0.250	-0.214	-0.321	-0.179
	p	0.702	0.589	0.589	0.645	0.482	0.702
	Male	1992	0.522 (7)	0.393 (7)	0.432 (7)	0.734 (7)	0.605 (7)
1996		0.406 (6)	0.320 (6)	0.339 (6)	0.624 (6)	0.531 (3)	0.548 (1)
2000		0.350 (1)	0.323 (1)	0.323 (5)	0.602 (5)	0.559 (6)	0.574 (6)
2004		0.353 (2)	0.355 (6)	0.314 (2)	0.597 (2)	0.528 (2)	0.541 (1)
2008		0.399 (5)	0.313 (1)	0.322 (4)	0.622 (5)	0.535 (5)	0.558 (5)
2012		0.385 (4)	0.299 (1)	0.318 (3)	0.611 (4)	0.534 (4)	0.554 (4)
2016		0.365 (3)	0.297 (1)	0.311 (1)	0.582 (1)	0.525 (1)	0.538 (1)
corr.		-0.429	-0.857	-0.893	-0.714	-0.607	-0.607
p		0.337	0.014	0.067	0.071	0.148	0.148
Female		1992	0.547 (7)	0.535 (7)	0.543 (7)	0.821 (7)	0.744 (7)
	1996	0.422 (2)	0.356 (1)	0.376 (2)	0.668 (1)	0.622 (4)	0.640 (1)
	2000	0.432 (4)	0.349 (1)	0.369 (1)	0.704 (4)	0.590 (2)	0.617 (1)
	2004	0.415 (1)	0.367 (4)	0.384 (4)	0.694 (3)	0.604 (3)	0.626 (1)
	2008	0.472 (5)	0.413 (6)	0.434 (5)	0.731 (6)	0.626 (5)	0.652 (5)
	2012	0.535 (6)	0.413 (5)	0.452 (6)	0.715 (5)	0.628 (6)	0.653 (6)
	2016	0.423 (3)	0.362 (1)	0.382 (3)	0.678 (2)	0.583 (1)	0.585 (1)
	corr.	-0.107	-0.036	0.080	-0.179	-0.393	-0.393
	p	0.818	0.939	1.000	0.702	0.383	0.383

Notes: (1) Numbers in the parentheses indicate the ranking of each edition regarding the level of competitive balance. (2) All the figures are rounded to the third decimal place only.

