

The Relationship of Gender Differences to Economic Development Worldwide

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Abstract: This paper examined the changing participation rates of women in the Olympics across several decades. We investigated the relationship between equity in participation rates with economic development. A regression analysis predicting GDP based on female participation rates showed that an increase of 1% in female participation rates was associated with an \$11.93 billion increase in GDP. We also examined the career persistence of male and female athletes. In 75% of countries, women have longer Olympic careers than men. We also compared the persistence of men and the persistence of women after males or females win a gold medal.

Keywords: Human development, human capital, competition, Olympics, gender differences, persistence

1. Introduction

The Olympic Games were held in ancient Greece. Most of the contestants were men. Until now, the proportion of women in the Olympic Games has been increasing. In "Women at the Modern Olympic Games: An Interdisciplinary Look at American Culture", Borish(1996) has expressed that women should have equal and fair rights and status in the modern Olympic Games through research from different academic fields, such as sociology and biology. Borish(1996) has claimed that various media and public comments have expressed that women are limited in their physiology and unsuitable for physical sports and competitions. Borish (1996) believes this is inappropriate. In addition, Borish(1996) has demonstrated that women are participating in the Olympic Games in increasing numbers these years. Borish(1996) also mentioned the women in Sports survey and suggested that women's games experience is crucial to the contemporary study of the modern Olympic Movement. Recognizing the various cultural roles of women in the Olympic world enhances the human dimension of the complex and fascinating story of the Olympics. 1996 marked the centenary of the modern Olympic Games as a meaningful phenomenon for women on the sporting field and, in turn, for social and cultural analysts studying the Games in the academic area.[1]

In "What Goes into a Medal: Women's Inclusion and Success at the Olympic Games*", Noland and Stahler(2015) have stated that the success of women in the Olympic Games is partly related to the country's gender inequality index. Noland and Stahler(2015) have pointed out that the process of women participating in and winning medals is complex, depending on education, workforce, economic and social status, and also involves a wide range of social attitudes towards gender issues.

Through the table analysis, Noland and Stahler(2015) have expressed that the number of female medals is significant, but it is also affected by choice of competitive strategy. Noland and Stahler(2015) also mentioned that in 1972, women's athletes from the Soviet Union and the United States tied for 19th place in the post-World War II Olympics, each taking home 17 percent of their medals.[2]

In "I do not think they realize how good we are': Innovation, inclusion, and exclusion in women's Olympic boxing", Tjonndal(2017) has stated that the marginalization and exclusion of women in boxing have become a major international issue. Women's boxing was included in the London 2012 Olympics for the first time. Tjonndal (2017) has pointed out that although women's boxing has entered the Olympics, structural and cultural social changes, including female participation in boxing, have yet to be implemented. In the book, Tjonndal(2017) pointed out that the public held the idea that having women's boxing in the Olympics would help improve the overall image of the sport, and it would see the sport as more pervasive and less dangerous, which is an excellent thing for boxing's image. Tjonndal(2017) has demonstrated that the claim that including women's boxing in the Olympics would help improve the image downplays the democratic right of female boxers to equal participation.[3]

In "A Gender Analysis of NBC's Coverage of the 2008 Summer Olympics", Davis and Tuggle(2012) have claimed that Olympic coverage is an essential aspect for female athletes because outside of the Olympics, many events receive little media attention. Davis and Tuggle(2012) have pointed out that the study found that while the number of women attending the Olympics increased, there was no increase in the number of events NBC covered for women. Davis and Tuggle(2012) have demonstrated that the Olympics represented far-reaching equality that embraced multiculturalism, including rejecting any form of discrimination based on race, religion, or gender. However, Davis and Tuggle(2012) have said sports coverage has never been as egalitarian as the Olympics, and this practice has resulted in a lack of equal attention for female athletes, causing harm to both spectators and participants.[4]

In "Swimming, South Africa and the Olympics: A History of Women's Participation", Hill and Grand'Maison (2017) claimed that South Africa had had a rich and relatively successful history in swimming since the Games began, with men reaching the top while women who did not make the podium failed to even qualify for the Olympics. Hill and Grand'Maison (2017) have pointed out that the gender gap is central to the history of South African sport and the country's sociopolitical development. Hill and Grand'Maison (2017) have demonstrated that each Olympic Games will coincide with major political events, affecting athletes' participation. In the history of the modern Olympic Movement, Hill and Grand'Maison (2017) have claimed the Olympic Movement will be a long era. In the 1900 Paris Olympic Games, the number of events increased.[5]

In "Gender Parity in the Olympics: Hying Women Athletes, Favoring Men Athletes", Eastman and Billings(1999) claimed that the proportion of male and female athletes and sports remains roughly the same imbalance. Eastman and Billings(1999) have pointed out that although the Olympic Games in 1996 were called the women's Olympic Games, after analysis, they did not help regarding women's equality. Eastman and Billings(1999) have demonstrated that a study of public comments and promotional profiles at the time shows that women's overall desirability declined, not improved, in 1996 and has not improved over time.[6]

In "Pretty versus Powerful in the Sports Pages", to examine how depictions of female athletes' performance might reflect dominant beliefs about gender in society, Jones(1999) conducted a content analysis of the four U.S. women's teams that won gold medals in basketball, gymnastics, soccer, and softball at the 1996 Olympics, and the U.S. women's hockey team at the 1998 Olympics. In the paper, two focuses include task relevance and the use of gender stereotypes. Consistent with Jones's (1999) expectations, print media depictions of female athletes in male sports often use male-to-female

comparisons and comments that have little to do with the sport or the performance of the athletes. Jones(1999), however, found that print media coverage of female athletes focused on performance while reinforcing stereotypes about women.[7]

In "A Descriptive Analysis of NBC's Coverage of the Centennial Olympics.", Tuggle and Owen(1999) have searched NBC's coverage of female athletes at the Olympics, both in individual and team sports. Based on their findings, Tuggle and Owen(1999) have claimed that women are widely covered, but the coverage focuses on individual sports like swimming, diving, and gymnastics, not team sports. Also, Tuggle and Owen(1999) have demonstrated that men's team sports receive far more coverage than women's team sports, while rivalries involving athletes, such as power or contact sports, pay little attention to women. In addition, more men are used as camera sources, and most event announcers are male. Media portrayals of female athletes may influence female participation rates.[8] In "Gender and politics at the 2012 Olympics: media coverage and its implications", Boykoff and Yasuoka (2015) have claimed that the media is mainly responsible for the social construction of lasting images and memories that viewers retain after the Games are over. The less extensive coverage that female athletes receive in the media may lead fewer young women to desire to participate in competitive athletics.[9]

In all of these papers, we see examples of growing female involvement in the Olympics. However, it is not clear that male and female Olympians make the same decisions and show the same behavior after getting involved in the Olympics. For example, many Olympic athletes are incredibly persistent: even after winning one medal, they continue competing to attempt to win many more. We wonder: Are men and women different in this respect? Do women usually relax after one gold medal? Do men get one medal and relax? Or do women always want to win more gold medals?

In "Gender Differences in Persistence and Attributions in Stereotype Relevant Contexts", Kiefer and Shih(2006) showed that gender stereotypes were attributed to their academic performance by studying math tests on the SAT. Kiefer and Shih(2006) have claimed that women are likelier to blame failure on personal ability, so they are less likely to persist in math. Also, Kiefer and Shih(2006) have shown that the value of this persistence is limited by the facts when receiving false feedback about failure. However, Kiefer and Shih(2006) concluded that the study might similarly affect men.[10]

Duda(1988) has demonstrated that students who place a high value on sports mastery are likelier to play sports for more extended and practice their sport more in their free time. In "The relationship between goal perspectives, persistence and behavioral intensity among male and female recreational sport participants", Duda(1988) made a questionnaire for college students about their type of exercise, the number of years they played, and the number of hours they practiced each week. Duda(1988) claimed that the results showed that women were less likely than men to focus on athletic goals based on social comparisons, especially among men and women who had previously played competitive sports.[11]

In "Gender Identity and Olympic Games: The Iridescence in Tokyo 2020", Lyu and Zhuotong(2021) claimed that equality and inclusion were well represented in Tokyo 2020. There is still gender discrimination in the Olympics, which has been going on for years. As the world's most popular sporting event, the Olympics has different stages of gender recognition. However, true gender equality has yet to be achieved. The Tokyo Olympics has positive implications for inclusive and equitable development. From there, growing inclusion and diversity will redefine the dynamics of gender competition in the Olympics.[12]

Overall, there is plentiful evidence of different treatment of men and women at the Olympics and different levels of persistence shown by different genders in different situations. This paper aims to investigate the different persistence levels of both genders among top Olympic athletes.

2. Data Analysis

Table 1 indicates that 73% of athletes in Olympic history have been men, so the female participation rate is 27%. Also, Figure 1 demonstrates that women's participation has continued to rise over the years. The source of data is sports-reference.com.

Table 1: The summary of sex, age, height, weight, and year of athletes.

Athlete Attributes	Mean	Standard Deviation	Minimum	Maximum
Sex	0.73	0.45	0	1
Age	25.56	6.39	10	97
Height	175.34	10.52	127	226
Weight	70.7	14.35	25	214
Year	1978.38	29.88	1896	2016

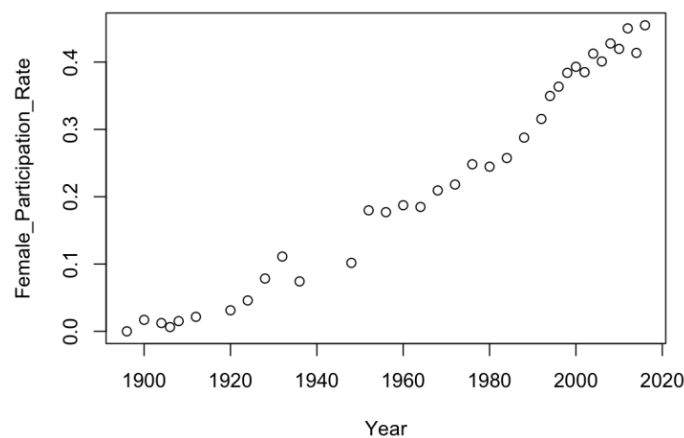


Figure 1: The trend of female participation rate from 1896 to 2016.

Hélène de Pourtalès, the first woman to win a gold medal in the Olympics, competed in the 1900 Summer Olympics representing Switzerland. She won the gold medal in the 1 to 2-ton 1st race and silver medal in the 1 to 2-ton 2nd race in the 1900 Paris Olympics. She was the first woman to represent Switzerland at the Olympics. Edwin Flack, the first man to win a gold medal in the Olympics, competed in the 1896 Summer Olympics representing Australia. He won the gold medal in the Men's 1500 meters in the 1896 Athens Olympics. Besides, he also won the gold medal in the Men's 800 meters and the bronze medal in men's double tennis at the 1896 Athens Olympics.

Career length is defined as the number of times an athlete has participated in the Olympics. For example, if an athlete participated in the Olympics in 2008 and 2012, the career length would be two. NOC (Name of Country), Sex, and the year of each athlete participating in the Olympic Games are extracted, from which the mean of male and female career length can be obtained. Then, Figure 2 shows the result that showed the difference in male and female career lengths in 49 countries in Olympic Games. The 49 countries were chosen because they had more than a thousand participants. There are 37 countries where female career length is longer than male's, such as China, the United States, Canada, Australia, Etc. Of these, the difference in career length between men and women in Romania is the greatest. So, we can infer that in about 75.5% of the countries in the world, female career length is longer than males.

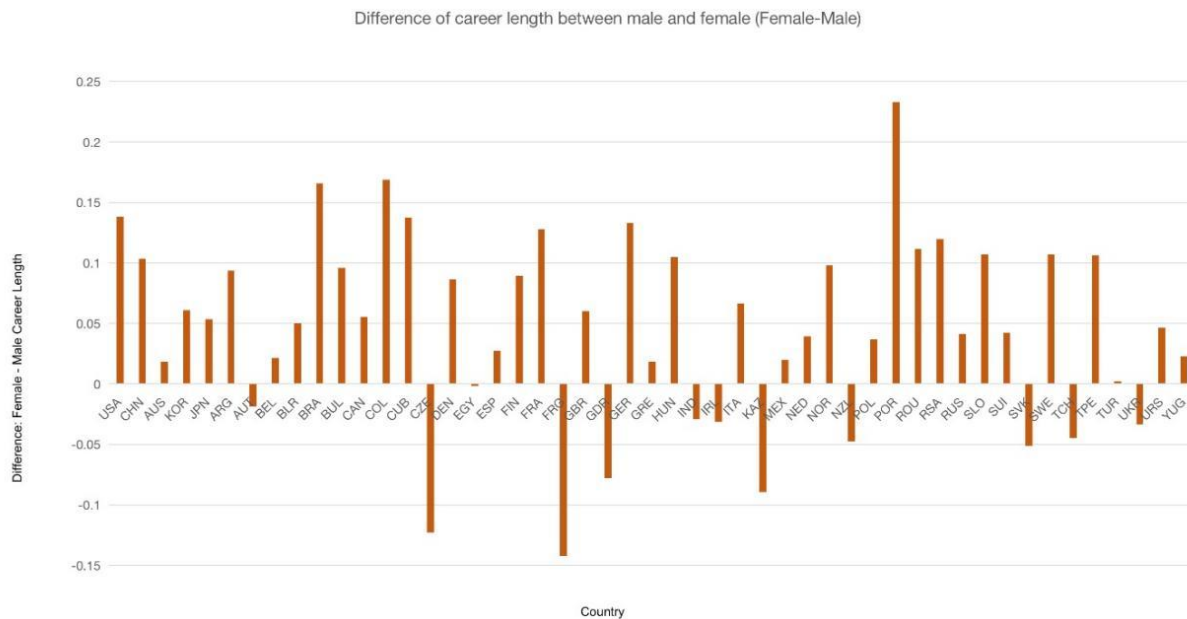


Figure 2: Difference of career length between male and female

In addition, if an athlete participates in the Olympics more than twice, it shows that the athlete has good persistence. Based on the data mentioned above, if the athlete did well in the first Olympics, they were likelier to participate in the second or third Olympics.

We also attempted to answer the following question: does a good performance in an athlete's first Olympics give them encouragement that motivates them to participate in future Olympics? This would indicate that high performance increases persistence.

To answer this question, we found records of each athlete's first Olympic participation and whether each athlete won a gold medal in their first year of participating in the Olympics. Then, we compared the participation rate in future Olympics of athletes who had won gold medals to those who had not.

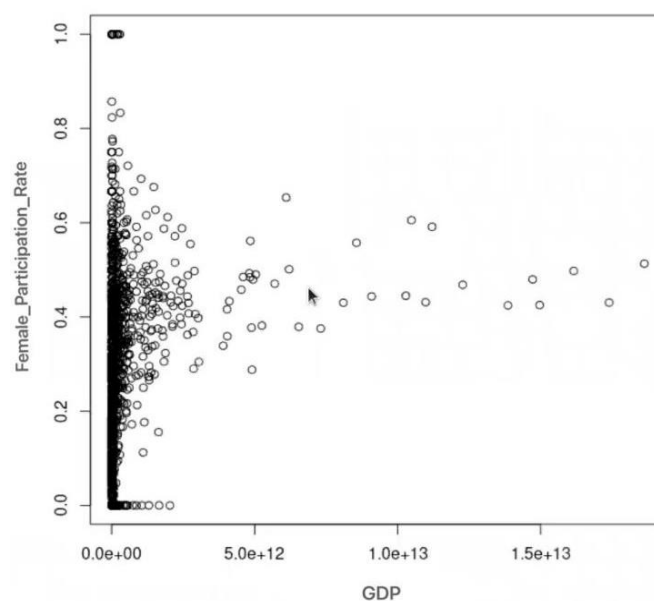


Figure 3: The relationship between GDP and female rates.

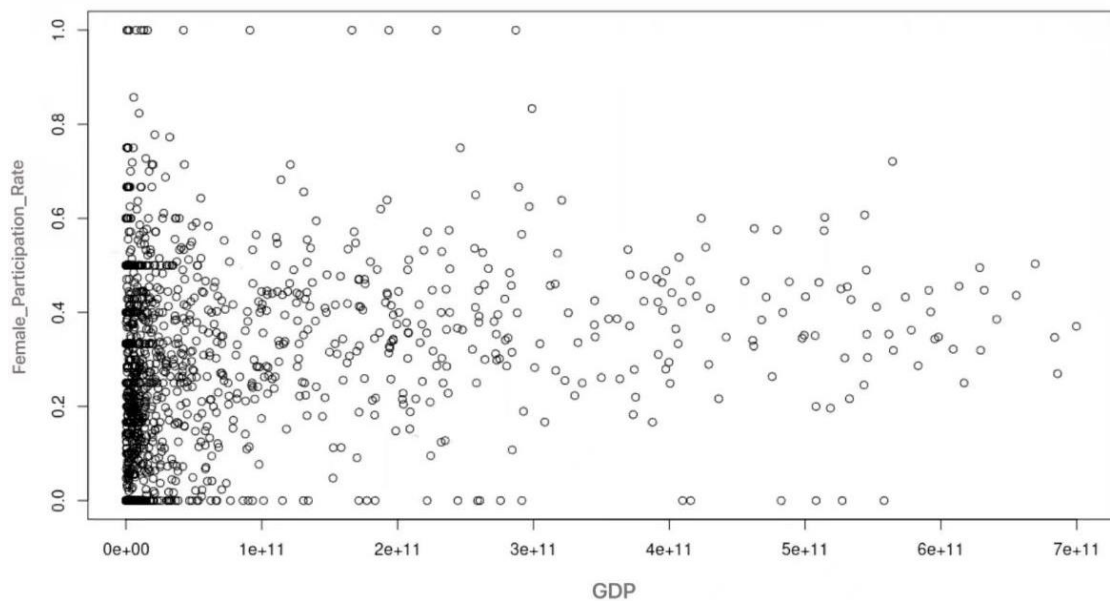


Figure 4: The relationship between GDP and female rates without the richest countries.

Table 2: Regression result – all coefficients measured in billions.

	(1)	(2)
Female Participation Rate	1,193***	128.6***
	(179.9)	(17.83)
R-squared	0.02839	0.03701
No. of observations	0.000011508	0.000011508

*** Significant at 1%

We found that athletes who won gold medals in their first year of participating in the Olympics were likelier to participate in future Olympics. Athletes who won gold medals in their first Olympics participated in future Olympic games 28.9% of the time, and athletes who did not win gold medals in the first Olympic games participated in future Olympics 23.8% of the time.

The different participation rates of men and women in international competitions could be related to human capital and development in the athletes' home countries. Figure 4 shows the data's relationship between female participation rates and national GDP.

In order to investigate this relationship, we performed a regression analysis using female participation rates to predict GDP across countries and years. The equation of the regression we estimated is:

$$\text{GDP} = \beta_0 + \beta_1 * \text{female participation rate} + \text{error}$$

We are primarily interested in the value of β_1 , the estimated effect of female participation rates on GDP. When we estimated this regression using data spanning 56 years and 257 countries, we found the results in Table 2, Column 1. In particular, we found that a 1% increase in female participation rates is associated with an \$11.93 billion increase in national GDP.

To test the robustness of this result, we further estimated the same regression equation, limited to countries with GDP below the 90th percentile. The result is shown in Table 2, Column 2, and the estimated effect is still significant and positive.

The several quantitative analyses in this section have shown clear and robust differences between male and female participation and persistence in the Olympics. More importantly, they have shown

that female participation rates are associated with higher GDP rates, with an effect size that is both statistically and economically significant.

3. Conclusion

In this paper, I analyzed data related to Olympic athletes and found that females, on average, have longer career lengths than males. I used this to conclude persistence in top-level athletics. This research adds to the literature on persistence psychology and provides an essential look at data from many decades of top-level athletic competition.

Personally, it can eliminate some people's gender stereotypes and establish the concept of gender equality, such as women on the disadvantaged side in sports. In "Social Media and the Olympics: A Chance for Improving Gender Equality.", Grabmüllerová(2022) has demonstrated that over time, the field of sport has evolved into a multicultural and global public sphere, and this development will lead to fairer treatment of female athletes. The conclusion is that women have a longer persistence.[13] In "Gender, Achievement, and Persistence in an Undergraduate Computer Science Program", I found a similar idea. The author concludes that if a student gets a grade of B or above in the CS program in the first semester, they are likely to participate in the courses in the next semester and get good grades. In this paper, I also found that high performance increases persistence rates. This finding could contribute to prescriptive research about how to increase persistence.[14]

The different outcomes that men and women achieve in competitions provide evidence that equity and empowerment need to be pursued more energetically to accomplish the human development goals we all share.

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