THE RELATIONSHIP BETWEEN FINANCIAL INCENTIVES FOR ATHLETES AND BRAZILIAN SPORTS RESULTS IN THE PAN AMERICAN GAMES

LA RELACIÓN ENTRE LOS INCENTIVOS FINANCIEROS PARA LOS ATLETAS Y LOS RESULTADOS DEL DEPORTE BRASILEÑO EN LOS JUEGOS PANAMERICANOS

A RELAÇÃO ENTRE INCENTIVOS FINANCEIROS AOS ATLETAS E RESULTADOS ESPORTIVOS BRASILEIROS NOS JOGOS PAN-AMERICANOS

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ABSTRACT

The aim of this study was to analyze the relation of financial subsidies on obtaining better sport results. The selection of data was accomplished by researching Brazilian athletes who competed in the Pan-American Games of Lima 2019. This study investigated the relationship between participation in the Brazilian Athlete Grant Program and medal achievement at the 2019 Lima Pan-American Games, using binomial logistic regression to analyze factors like gender, grant category, and sport type. Data on 481 Brazilian athletes, distributed across 40 different sports, were collected from official sources and analyzed using IBM SPSS Statistics to determine the odds ratio of winning a medal. The analysis reveals that receiving large amounts of value may be related to the improvement in sports results. The data indicate that greater investment in athletes generates better results. Compared with the value received in these years, it is possible that an athlete whose value is not high but whose value is received

steadily increases his chances of obtaining a medal. In addition, gender did not significantly affect the results obtained, and athletes representing individual modalities tended to obtain more medals.

Keywords: sports & state, sports, sports competitions, Brazil.

RESUMEN

El objetivo de este estudio fue analizar la relación de la subvención económica en la obtención de mejores resultados deportivos. La selección de datos se realizó mediante la investigación de los atletas brasileños que compitieron en los Juegos Panamericanos de Lima 2019. Este estudio investigó la relación entre la participación en el Programa Beca Atleta brasileño y la obtención de medallas en los Juegos Panamericanos de Lima 2019, utilizando regresión logística binomial para analizar factores como el género, la categoría de la beca y el tipo de deporte. Se recopilaron datos de 481 atletas brasileños, distribuidos en 40 deportes diferentes, de fuentes oficiales y se analizaron utilizando IBM SPSS Statistics para determinar la razón de posibilidades de ganar una medalla. Del análisis se desprende que recibir grandes cantidades de valores influye en la consecución de resultados deportivos. El análisis revela que recibir grandes cantidades de valor puede estar relacionado con la mejora en los resultados deportivos. Comparando el valor recibido en estos años, es posible que un deportista con una beca de no tan alto valor, pero recibida de manera constante, aumente sus posibilidades de obtener una medalla. Además, se puede observar que el género no presentó diferencias significativas para la obtención de resultados, así como que un deportista que representa modalidades individuales tiene mayor tendencia a obtener medallas.

Palabras clave: deportes y estado, deportes, competencias deportivas, Brasil.

RESUMO

O objetivo deste estudo foi analisar a relação do subsídio financeiro na obtenção de melhores resultados desportivos. A seleção dos dados foi realizada por meio de pesquisa com atletas brasileiros que disputaram os Jogos Pan-Americanos Lima 2019. Este estudo investigou a relação entre a participação no Programa Bolsa Atleta brasileiro e a conquista de medalhas nos Jogos Pan-Americanos de Lima 2019, utilizando regressão logística binomial para analisar fatores como gênero, categoria da bolsa e tipo de esporte. Dados de 481 atletas brasileiros, distribuídos em 40 modalidades esportivas diferentes, foram coletados de fontes oficiais e analisados utilizando o IBM SPSS Statistics para determinar a razão de chances de ganhar uma medalha. A análise revelou que receber grandes quantias de recursos pode estar relacionado à melhora nos resultados esportivos. Os dados indicam que maior investimento

nos atletas gera melhores resultados. Comparando o valor recebido nesses anos, é possível que um atleta com bolsa de valor não tão alto, mas recebida constantemente, aumente suas chances de obter uma medalha. Além disso, pode-se observar que o gênero não apresentou diferenças significativas na obtenção de resultados, bem como que um atleta que representa modalidades individuais tem maior tendência à obtenção de medalhas.

Keywords: esportes & estado, esportes, competições esportivas, Brasil.

INTRODUCTION

The development of sports worldwide is associated with government policies. The positive contributions of the sports phenomenon, such as improved health and well-being and personal and social growth, in addition to economic development, contribute to public government intervention in this area (Berry & Manoli, 2018). For Wicker (2012, p.221), “furthermore, the athletic performance of countries can considerably contribute to their global reputation and perception”. In this way, “sporting success” is also an important resource for assisting in the development of nonsporting goals (Houlihan & Green, 2007; Funahashi et al., 2015). According to the literature, we can understand sporting success as international sporting performance, which can be represented by medals, classifications, rankings, or even representation in sporting events (Houlihan & Green, 2007; De Bosscher et al., 2009).

In Brazil, the government is responsible for current sport policies. The promotion of sport in Brazil takes place through public budgetary and extrabudgetary resources (Castro et al., 2015; Reis et al., 2015). The largest budget financing program in the country, which, at the same time, aims to respond to the lack of investments from the private sector, was the government approved in July F9, 2004, by the Federal Law n° 10.891/2004, the Athletes Grant Program (Programa Bolsa Atleta in Portuguese), which has objective benefits for athletes of elite sports with podium results in national or international competitions (Brasil, 2004; 2005). According to Camargo et al. (2020), the main beneficiaries of the program are athletes of Olympic and Paralympics sports, linked with the International Olympic Committee (IOC) and the International Paralympic Committee (IPC), which reach good results in local, South American, Pan-American, world, Olympic and Paralympic competitions.

Between 2005 and 2018, the Brazilian government invested BRL 1.2 billion[1] in 66.862 grants to 25.495 athletes (one athlete can receive more than one grant) (Instituto de Pesquisa Inteligência Esportiva - IPIE-UFPR., s.f.). It is known that financial factors are not the only variables determining the development of athletes (Ordonhes, 2024). However, they can be considered a fundamental factor for accessing other key variables in the athletic development process, playing an essential role in the pursuit of sporting success (Houlihan & Green, 2007; De Bosscher et al., 2009). Based on this, the present study aimed to analyze the relationship

between financial subsidies provided to athletes and the achievement of better sporting results in the Pan American Games.

METHODS

Characterization of the study, procedures and sample overview

This study has a quantitative approach and sought to carry out some statistical crossings in order to identify possible inferences about the achievement of sports results. For this study, the selection of data was performed by researching the Brazilian athletes that competed in the Pan-American Games of Lima 2019 on the Brazilian Olympic Committee and on the event's official website, and these data were crossed with the database of beneficiaries of the Athletes Grant Program. The selection of this particular sample was made in light of the 2019 Lima Pan-American Games, which were notable for the record-breaking medal count and the second-place finish of the Brazilian team - a feat not achieved in 56 years. This highlights the potential significant impact of the country's public investments in recent years. Furthermore, the analyses conducted in this study form part of a larger project undertaken by the Sports Intelligence Research Institute (Instituto de Pesquisa Inteligência Esportiva - IPIE-UFPR , s.f.).

The data were organized on an electronic spreadsheet in Excel, with specific athlete information available by the Inteligência Esportiva Project and the Special Secretary of Sports from the Brazilian Government, with the following information: 1) athlete sport; 2) athlete sex; 3) athlete information (name, club and sports event); 4) grant category (National, International, Olympic/Paralympic or athlete Podium); 5) grant monthly value; 6) grant annual value; and 7) athlete results in Lima 2019.

After cataloging the data, analyses of the material were initiated, and a verification of the selected sample was first developed. Data from 481 Brazilian athletes who took part in the Pan-American Games were collected. Among those, 235 (48.85%) were male and 246 (51.14%) were female and were distributed across 40 different sports (Research Ethics Committee of the Federal University of Paraná, CAAE n° 88770618.4.0000.0102, opinion n° 2.748.001).

Data analysis

Data analysis was conducted via IBM SPSS Statistics for Mac (version 26). Initially, a normality test was conducted on the data, along with descriptive statistics. Subsequently, a Binomial Logistic Regression was performed to determine the effects of the independent variables — gender, athletes supported by the Athlete Grant Program, grant category, and individual or team sports — on winning a medal at the Lima 2019 Pan American Games (Kleinbaum et al., 1982). An odds ratio of 1.0 (the null value) indicates no association between the exposure and the outcome. A value greater than 1.0 indicates a positive association or an

increase in the odds of an outcome occurring given a particular level of the independent variables. A value less than 1.0 indicates an inverse association or a decrease in the odds of an outcome. The 95% confidence interval around the odds ratio estimate is calculated via the beta coefficient for the exposure variable and its related standard error. Confidence intervals that exclude 1.0 indicate statistical significance at the .05 probability level.

RESULTS

The average age of the athletes in the sample was 26.8 years, with the youngest athlete being 15 years and the oldest being 68 years old. Among the athletes in the sample, 63.20% were born in the Brazilian southeast region, 16.42% in the southern region, 11.02% in the northeast region, 5.20% in the Midwest region and 2.08% in the Brazilian north region. The other 2,08% were born outside the country.

An analysis of the Pan-American Games results revealed that 729 results were obtained for 481 athletes in the sample, considering that each athlete could obtain more than one result. There were 171 medals[2], where 275 athletes (57.17% of the sample) took the podium, considering that one medal could be obtained by more than one athlete (in collective sports, for example) and that one athlete could make it to the podium more than one time. The average position achieved in the 729 results was the 5th place, in which 15 results were considered “DNS” (did not start) or “DNF” (did not finish), while 350 results were podium finishes.

Table 1

Distribution of grants and results

Grant Category	Average Position	Quantity of Results
Without Grant	5,89	192
National	5,55	130
Internacional	5,38	158
Olympic	4,42	141
Podium	3,24	107

Source: the authors

An analysis of the distribution of the beneficiaries of the Athletes Grant Program in the Brazilian delegation revealed that 69.85% of the sample was contemplated by the program during the Pan-American Games, whereas 30.14% did not receive the grant at that time. Among those beneficiated, 19,94% were from the category Athlete Podium (the highest category, dedicated to athletes between 20th and 1st place in the world ranking in their sports – grant between BRL 60.000 and 180.000/year); 26.29% from the Olympic category (for

athletes with participation in Olympic games – grant of BRL 37.200/year); 28.86% from the International category (for athletes with podium in international events – grant of BRL 22.220/year); and 25.59% from the National category (for athletes with podium in national events – grant of BRL 11.100/year).

With respect to the history of grants of those athletes, during their careers, 86.48% of the sample received the Athletes Grant at least on time, whereas 13.52% never received the grant. Importantly, sports other than the Olympic Games program were not contemplated between 2017 and 2019, as six of those sports were presented in the Pan-American Games of Lima 2019, which means that the athletes of these sports were not able to apply for the grant. For the Pan-American Games, 86.07% received Athlete Grants in the Lima 2019 Cycle (between 2016 and 2018) at least once. The investment in those athletes in the cycle was BRL 36.7 million, with 987 grants for 414 athletes.

According to the results obtained in the games, Brazilian athletes conquered 171 medals (55 gold, 45 silver and 71 bronze), placing Brazil in second place on the medal board, with the best performance in the country in the history of the competition. Among the obtained medals, 141 (82.46%) were conquered by athletes with a grant or with the participation of athletes with a grant (a team with at least one athlete with a grant), whereas 30 (17.54%) medals did not have the participation of athletes with a grant.

To verify the ability of the Bolsa Atleta Program to win the Lima 2019 medal, a binomial logistic regression test was carried out. In addition, the effects of gender, grant category and participation in individual or collective sports on winning medals were analyzed.

Considering the four-year competitive cycle, the athlete who receives a lower grant amount throughout the cycle, as he is in a lower grant category, is less likely to win a medal than an athlete who receives a higher incentive value (Q1 = between 11,100 and 33,300; Q2 = between 33,301 and 55,500; Q3 = between 55,501 and 96,600; and Q4 = more than 96,601). Therefore, it is clear that the chances of winning medals increase among athletes who received higher amounts of funding during the competitive cycle. In this way, the probability of an athlete who is in Q3 in relation to one who is in Q1 to win a medal is approximately 2.6 times greater. The probability of an athlete who is in Q4 in relation to one in Q1 to win a medal is approximately 3.8 times greater (Table 2).

Table 2

Variables in the Equation (type of modality)

	B	Wald	*Sig.*	*Exp(B)*	I.C 95%[a]
Gender	-.159	.466	.495	.853	(.541) – (1.345)
Type of modality	.343	1.898	.168	1.409	(.865) – (2.296)
Q1		20.085	.000		
Q2	.266	.647	.421	1.305	(.682) – (2.496)
Q3	.953	8.647	.003	2.595	(1.374) – (4.898)
Q4	1.332	14.676	.000	3.790	(1.917) – (7.493)
Constant	-.334	1.198	.274	.716	

Source: the authors

Compared with those who do not receive a grant, the chances of winning a medal for those who receive a grant increase according to the type of grant they receive. Also, this difference was statistically significant only when the athlete was in the highest category, such as the podium category, which proved to be a significant predictor [$p<0.05$] (Table 3).

Table 3

Variables in the Equation (grant category)

Variables in the Equation					
	B	**Wald**	***Sig.***	***Exp(B)***	**I.C 95%[a]**
No grant		13.993	.007		
National	-.339	1.556	.212	.713	(.419) – (1.213)
International	.005	.000	.985	1.005	(.602) – (1.676)
Olympic	.534	3.528	.060	1.705	(.977) – (2.975)
Podium	.749	5.567	.018	2.116	(1.135) – (3.943)
Constant	.177	1.147	.284	1.194	

Source: the authors

Therefore, it is clear that an athlete in the podium category is approximately 2.1 times more likely to win a medal than those who did not receive any type of financial support in the year prior to the games.

DISCUSSION

Some studies consider that the modeling of athletic progress could be based on athlete development models (Barker-Rutchi et al., 2018; Bruner et al., 2009). In line with this idea, Barker-Rutchi et al., (2018) consider that sport organizations that have adopted, adapted and/or developed athlete development models provide more investment to athletes. This strategy is particularly useful for institutions that heavily depend on public funding to finance their elite athletes.

In our sample, this scenario is particularly relevant because the Athletes Grant Program is the most important program in terms of athlete support in Brazil, with an investment of BRL 1.2 billion between 2005 and 2019, directly to the athletes. In line with this idea, measuring the impact of this investment on results may aid in understanding whether this financial support influences athletes' performance. The present study aimed to analyze the relation of financial subsidies on obtaining better sport results. The analysis reveals that receiving large amounts of value may be related to the improvement in sports results.

Observing the results generated by the quartiles, the data indicate that greater investment in athletes generates better results, notably considering the investment made in the 4-year cycle that precedes the event. In this sense, it is understood that medium- and long-term investment in athletes is beneficial in the search for better sport results.

Compared with the value received in these years, it is possible that an athlete who has not received high-value grant but has received it steadily for 4 years increases his chances of obtaining a medal. This may indicate that a consistently established investment policy can have a significant impact on the sporting results of athletes and, consequently, the country (Costa et al., 2024).

As reported in the literature, funding is considered an important factor for athletes to achieve success, with incentives in the form of grants contributing to sports development. Similarly, a lack of financial support can harm the sports performance of athletes (Duffy et al., 2006).

When we look at the chances divided by grant category, which has a direct relation with the amount received, we perceive a significant difference only in the Podium category, which benefits athletes already with consolidated international success, precisely because it is aimed at athletes between the twenty placed first in the world ranking of their Olympic disciplines. That is, a group of athletes, such as the Pan de Lima 2019, theoretically favors winning a medal in a continental competition.

Considering that the purpose of the podium athlete category is to win medals at the Olympic Games (De Souza, 2021), this significant difference found in the category points to a successful policy, as athletes who are considered by it effectively have a greater chance of having better results.

These athletes are 7x more likely to win a medal than athletes who did not receive any grant category in the previous year, which makes it an interesting action from the point of view of selected athletes. Here, one can question the fact that the category only supports athletes with proven success, but considering its objective as the improvement of the chance of winning medals, the data presented in this study show that the policy is effective in obtaining the expected result.

The increase in investments can amplify the possibility of athletes dedicating more time to elite sports, increasing their training time, physical capabilities, training quality, and possibility of competing in high-level events. However, the possibility that other resources exist cannot be excluded (Berry & Manoli, 2018), such as access to specific training structures, efficient technical monitoring, and family support (De Bosscher et al., 2009; Houlihan & Green, 2007; Green & Oakley, 2001).

In addition, gender did not significantly affect the results obtained, and athletes representing individual modalities tended to obtain more medals. Capranica et al. (2013) consider that comparing gender in sports performance is necessary to consider the equality of opportunities. Although Brazilian law does not specify a quota by gender in the program, there is a balance between men and women in the Athletes Grant. Since 2013, the percentage of men and women has varied between the margins of 41% and 46% for women and 54% and 58% for men, considering grants to athletes of Olympic sports. With a direct results base criterion of distribution, the program does not consider gender as a way to determine which athlete will be chosen.

Given that an athlete belonging to an individual or collective modality does not change his chances of obtaining impressive results, it is important to consider that, in this study, we considered a result per athlete and not the result of the team as a whole. This is because we consider that the objective of the investment made by the country is the sport development of athletes, which, despite generating only a collective result, occurs individually. That is, a medal won by a soccer team creates 23 new “individual” medalists in that event, which is interesting from the governmental point of view, generating new athletes with a positive sporting history that may eventually encourage the entry of young people into the sport (Grix & Carmichael, 2012; Van Bottenburg, 2002). In this sense, it is necessary to discuss as a nation whether the objective in a sporting mega-event is the generation of successful athletes or the placement of the country in the medal table, and the medal table considers collective results unique and not by athletes present on the team.

Even so, the data shown in the study need to be considered carefully. The fact that the athlete has good previous results and a "prediction" of winning a medal does not mean that he will achieve this result. In this study, we observed several factors, but not all. Considering only certain factors and possible results can lead managers to make incorrect investments

(Rewilak, 2021) in their eagerness to achieve better sports results. Therefore, in this work, we discuss a greater probability of results, aware of the imponderables that surround the sport. In addition to this, we emphasize the limitation of the study in having evaluated only one edition of the Pan American Games, with the possibility of exploring new editions in future studies.

CONCLUSION

Considering the data used in this study, it is possible to conclude that the highest investment made in athletes in the 4-year cycle that precedes a sporting event increases the chance of winning a medal, depending on the amount invested. This finding indicates that a constant investment with high financial value contributes to obtaining better sport results.

Therefore, considering the findings that indicate the benefits of investment throughout the entire cycle leading to the competition, it can be inferred that more consistent support for athletes may yield better results than one-time investments. In other words, it is recommended that public policies follow a medium and long-term planning approach when investing in high-performance athletes. It is important to emphasize that further studies - especially those observing more competitions and over a longer period - should be conducted to strengthen these findings.

We also concluded that there is no significant effect by gender of athletes or by type of modality, which opens the possibility of independent investment in these two variables, without the need to focus on one to the detriment of the other. This study only observed the investment made by a policy adopted by the country, aware that it is not the only source of funding for athletes or the only existing policy for high-performance sports in the country. Therefore, new studies that consider the investment more completely in the modalities may indicate more specific and detailed results. In addition to other variables not observed in this study, they may also influence the results obtained by the athletes.

NOTES

1. 1 dollar is equivalent to approximately 6 reais.
2. Importantly, the results data considered were collected immediately after the end of the competitions, with subsequent changes due to doping. Officially, at the time of the development of this study, Brazil had 169 medals won, 54 of which were gold, 45 silver and 70 bronze. However, for this study, such punishments were disregarded, taking into account that doping penalties can occur years after the end of a competition, making the data variable.

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