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ORIGINAL ARTICLE

Macroeconomic Factors and Elite Female Tennis Successes in the BRICS Countries: A Correlation Analysis

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ABSTRACT

Background. The five members of the BRICS alliance play an ever-increasing role in shaping today's global economy. On the other hand, players stemming from these countries have a disproportionately low share among the top-ranked female tennis players. **Objectives.** The paper seeks to reveal whether the recent economic expansion of these countries is associated with more flourishing sports advancements of female tennis players. **Methods.** Based on the data encompassing the period 2012-2021 and stemming from the WTA rankings and the World Bank Database, a correlation analysis has been executed to investigate whether macroeconomic and socio-political indicators explain the advancements of female tennis players stemming from these countries. **Results.** Some macroeconomic indicators, like per-capita GDP, are positively correlated, while others, like gross national expenditure and the alternatives offered to be educated, are negatively correlated with the advancements of the players; hence, a clear-cut decision as to whether economic well-being fosters sport successes or not could not be reached. **Conclusion.** While a certain level of well-being is needed to succeed in sports, achieving outstanding performance is no longer considered a prosperous way to elevate social status after reaching a certain level of well-being. As such, players from less developed countries might be more motivated to strive for outstanding results.

INTRODUCTION

The tennis industry has become a massive business in today's globalized world. The world's best players achieve outstanding results and make considerable money. On the other hand, Cahill and MacNamara (2024) have recently demonstrated that the top-performing players usually stem from a small core group of nations, as the lack of appropriate financial resources, inadequate competition structures, and limited support from various stakeholders pose several challenges to less developed tennis nations (1). While witnessing substantial economic development in recent years, players stemming from the BRICS countries still possess a disproportionately low share among the top-ranked players, especially when the size of these countries is also considered.

Several papers have examined whether sport boosts economic growth or fosters social development. In the case of developing countries,

Acquah-Sam (2021) concluded that investments in sports accompanied by adequate policies contribute to economic expansion (2).

On the other hand, only a few authors have investigated the opposite effect so far; whether economic development and social well-being nurture sport successes (3-8). Even though these factors should not be deemed as the only determinants of success, a prior study has already concluded that specific macroeconomic indicators play a role in promoting sport successes to some extent (6). In the case of tennis, Varmus et al. (2022) found some empirical evidence that economic prosperity in terms of GDP contributes to more successful career paths (7).

BRICS is an intergovernmental organization comprising Brazil, Russia, India, China, and South Africa. Economic development of these countries is primarily driven by the cheap labour in China and India, as well as the enormous reserves of mineral resources in Brazil and Russia (9). The alliance is increasingly recognized as the foremost geopolitical rival to the Western G7 as its member countries possess considerable political and economic potential. The combined share of the alliance in the global economic output has risen from 5.85% to 21.5% in recent decades. As of 2023, the BRICS' economies collectively accounted for over 25% of global economic output with a cumulative nominal GDP of $14.9 trillion and as such, the alliance plays a compelling role in shaping today's economy (10).

The BRICS Council for Exercise and Sport Science aims to enhance the quality of life by promoting exercise, physical activities, and sports (11). As human capital and its well-being are increasingly recognized to be essential to nurturing economic expansion (12), several incentives to foster physical activities have been developed (13); for instance, Russia's sport strategy for the period up to 2030 foresees an increasing participation in mass sports (14). On the other hand, Xiang et al. (2023) concluded that there are several significant obstacles in promoting physical activity in China (15).

The number of spectators of various championships is continuously growing in India due to the recent economic expansion and rising educational and income levels (16). On the other hand, Clarke and Mondal (2022) argue that the government's sport policy is outdated and the country has failed to achieve mass participation or outstanding results in elite sports (17).

Until 1993, South Africa had been dominated by apartheid. In the decades thereafter, sport has been increasingly recognized as a tool for reconciliation and international success. The role of sport in boosting tourism has been recognized over time, so a flourishing relationship between sports and tourism exists in the country (18).

In Brazil, sports play a crucial role in facilitating social transformation and addressing social challenges (19); however, Mazzei et al. (2015) argue that despite several advancements in this field, there is room for further improvement, especially concerning strategic planning (20).

Even though Vamplew (2023) argues that quite often 'hosting mega events promises the economy more than it delivers' (21), these 'mega' sports events significantly contribute to the growth of the tourism sector of these economies (22) and also play a pivotal role in their foreign politics (23). Achieving outstanding successes in elite sport is crucial to promote physical activities and provide role models for younger talents, as evidenced by Brouwers et al. (24).

While economic advancements of the BRICS countries are getting increasing attention, their successes in the field of sports are seldom studied, and it has not been clarified yet, why these countries possess a disproportionately low share among the top-ranked tennis players (1), especially since previous studies posit that increases in income are associated with increasing popularity of sports (16). Despite the ever-growing economic role of these countries, only a few studies have examined how macroeconomic and socio-political factors influence elite tennis success in these countries. Therefore, this paper seeks to reveal whether the recent economic expansion of the BRICS countries implies a more successful future career path for players from these countries. Understanding how macroeconomic development shapes sports successes offers valuable input for developing sports policies intended to promote physical activity and enhance the global competitiveness of players stemming from these countries (11-13). Moreover, considering that most prior studies focus on Olympic successes or football (3-6, 8), it is worth investigating whether economic well-being shapes individual advancements in tennis similarly as it fosters Olympic successes or the success of national football teams.

MATERIALS AND METHODS

Study Design. Based on various macroeconomic factors, the paper attempts to predict the success of elite women players listed in WTA rankings for singles and originating from BRICS countries by examining the correlation between socioeconomic indicators and the athletes' success. The success of a player in a given year is expressed in terms of three indicators, namely, (i) the total prize money won by the player, (ii) the prize money per match, and (iii) the normalised score in the WTA-rankings in the given year (25), respectively. In order to facilitate the comparison of the players' performances across several years, the WTA-scores have been normalized to the [0, 1] domain; since the top 800 contains at least one player from each of the investigated economies, the normalized score of the 800th-ranked player is considered to be 0. It should be noted that only the results of the best performer in each country have been further analysed in the research. The indicators used as measures of success are not self-evident, mainly because no consensus is likely to have been reached on how to measure individual sport successes so that the resulting indicator simultaneously measures the player's performance along with the financial 'benefits' gained. Gómez-Rodríguez et al. (2024) concluded that the number of medals won is used most often as a measure of success (8); however, this concept is not directly applicable in the case of tennis, and it is unsuitable to 'capture' the financial 'rewards' originating from outstanding performance. By relying on the aforementioned three indicators, individual performances and the associated financial benefits could be considered. Having identified those macroeconomic indicators that might shape sports successes, the paper also attempts to disclose the mechanisms through which these indicators affect the advancements of athletes. The research framework is showcased in Figure 1.

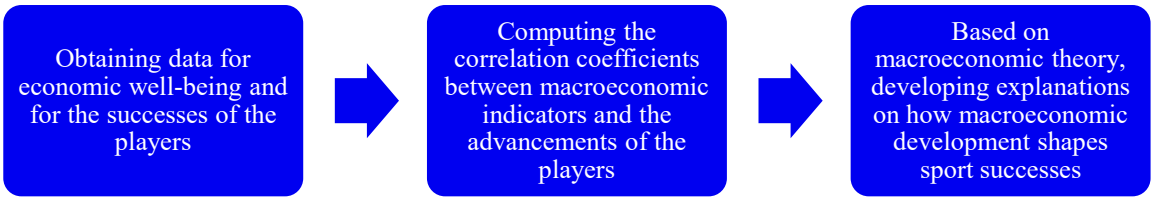

Figure 1. The research framework is made up of two steps: the identification of variables that are related to the success of the players and the explanation on how these variables might shape the players' advancements.

Participants and Data Collection. In order to investigate the relationship between various macroeconomic indicators, social well-being, and the achievements of women's tennis players during the 10-year-long period between 2012 and 2021, several macroeconomic indicators have been collected from the World Bank Database (26). An indicator is selected to be incorporated into the analysis if and only if it meets the following criteria: (i) it is directly related to the economic development (e.g. per-capita GDP, foreign direct investment), or to the political environment (control of corruption, government effectiveness) or the broader social well-being of the country (life expectancy at birth, income), (ii) data are available for at least one year for each of the investigated economies and (iii) no more than 20% of the dataset is missing. Missing data are replaced by the average value of the time series for the investigated country; if there is no data for at least one of the countries, then this variable is excluded from subsequent analyses. Altogether 39 variables meet these criteria (see Table 1); for a proper definition of these indicators, refer to the World Bank Glossary (27). Therefore, the final sample size is 50, encompassing a 10-year-long period for each of the five countries; 2022, 2023, and 2024 data had not been available at the time of investigation. Data are processed with Gretl and MATLAB 2024b software.

RESULTS

Pearson's product-moment correlation coefficients have been computed to reveal which macroeconomic indicators might be associated with the success of female tennis players, based on 50 observations encompassing a 10-year-long period for each of the five investigated countries. They are listed in Table 1 and are displayed on a heatmap in Figure 2.

Table 1. Bivariate correlation coefficients and the corresponding p-values (in parentheses) between various macroeconomic variables obtained from the World Bank Database and indicators measuring the successes of the elite female players stemming from the BRICS countries.

Variable	Prize money	Prize money/match	Normalised score
Access to electricity (% of total population)	0.345 (0.007)***	0.391 (0.002)***	0.451 (0.001)***
Adjusted net national income	-0.094 (0.257)	-0.133 (0.179)	-0.062 (0.334)
Birth rate (per 1000 inhabitants)	-0.355 (0.006)***	-0.444 (0.001)***	-0.480 (0.000)***
Control of corruption	-0.664 (0.000)***	-0.685 (0.000)***	-0.685 (0.000)***
Current account balance (% of GDP)	0.518 (0.000)***	0.575 (0.000)***	0.592 (0.000)***
Employment rate of 15–24-year-olds (%)	0.183 (0.102)	0.204 (0.078)*	0.263 (0.033)**
Exports - goods and services (% of GDP)	0.305 (0.016)**	0.313 (0.013)**	0.289 (0.021)**
Final consumption expenditure (% of GDP)	-0.261 (0.034)**	-0.309 (0.014)**	-0.335 (0.006)***
GDP per capita PPP ($)	0.534 (0.000)***	0.605 (0.000)***	0.614 (0.000)***
GDP growth (annual %)	-0.009 (0.474)	-0.033 (0.411)	0.020 (0.446)
General government final consumption expenditure as % of GDP	0.135 (0.175)	0.158 (0.136)	0.161 (0.132)
GNI growth (annual %)	0.009 (0.475)	-0.012 (0.466)	0.042 (0.387)
GNI on PPP basis ($)	0.532 (0.000)***	0.605 (0.000)***	0.614 (0.000)***
Government efficiency index	-0.285 (0.022)**	-0.229 (0.055)*	-0.213 (0.069)*
Government expenditure on education (% of GDP)	-0.377 (0.003)***	-0.415 (0.001)***	-0.425 (0.001)***
Gross domestic savings (% of GDP)	0.261 (0.034)**	0.309 (0.014)**	0.355 (0.006)***
Gross national expenditure (% of GDP)	-0.562 (0.000)***	-0.610 (0.000)***	-0.627 (0.000)***
Gross savings (% of GDP)	0.188 (0.095)*	0.230 (0.054)*	0.274 (0.027)**
Import value index (2015 = 100%)	0.476 (0.000)***	0.473 (0.000)***	0.481 (0.000)***
Imports - goods and services (% of GDP)	-0.082 (0.285)	-0.111 (0.221)	-0.144 (0.159)
Industrial and construction production volume (% of GDP)	0.280 (0.024)**	0.333 (0.009)***	0.384 (0.003)***
Industrial production volume (% of GDP)	0.031 (0.415)	0.073 (0.307)	0.125 (0.194)
Inflation (consumer prices, %)	0.203 (0.079)*	0.202 (0.080)*	0.093 (0.259)
Inflation (GDP deflator, %)	0.165 (0.126)	0.150 (0.149)	0.147 (0.155)
Inflation based on base year 2010	-0.197 (0.085)*	-0.153 (0.144)	-0.168 (0.121)
Inward foreign direct investment (% of GDP)	-0.113 (0.218)	-0.154 (0.143)	-0.120 (0.202)
Life expectancy at birth	0.132 (0.181)	0.182 (0.103)	0.237 (0.049)**
Net external assets (in current currency)	0.351 (0.006)***	0.444 (0.001)***	0.462 (0.000)***
Net primary income (Bop, current USD)	-0.262 (0.033)**	-0.312 (0.014)**	-0.303 (0.016)**
Net secondary income (Bop, current USD)	-0.316 (0.013)**	-0.348 (0.007)***	-0.376 (0.004)***
Political stability and crime/terrorism deficit	-0.274 (0.027)**	-0.268 (0.030)**	-0.235 (0.050)*
Ratio of female workers to male workers	0.310 (0.014)**	0.358 (0.005)***	0.382 (0.003)***
Real interest rate (%)	-0.235 (0.050)*	-0.257 (0.036)**	-0.253(0.038)**
S&P Global Capital Markets Index (annual % change)	-0.080 (0.290)	-0.086 (0.275)	-0.046 (0.377)
Services sector output (% of GDP)	-0.126 (0.192)	-0.127 (0.189)	-0.159 (0.135)
Total self-employed (% of total employed)	-0.444 (0.001)***	-0.476 (0.000)***	-0.473 (0.000)***
Trade turnover (% of GDP)	0.090 (0.266)	0.087 (0.275)	0.066 (0.324)
Value of women's business and legal index (scale 1-100)	-0.270 (0.029)**	-0.290 (0.020)**	-0.300 (0.017)**
Working age population	-0.082 (0.286)	-0.056 (0.349)	-0.019 (0.449)

Relationships marked with *** are significant at the 1% significance level, relationships marked with ** at the 5% significance level, while relationships marked with * at the 10% significance level.

Based on the results shown in Table 1, the bulk of the investigated variables exhibit a statistically significant ($p<0.1$) relationship with all three variables used to capture the advancements of the players, and as such, economic or social well-being explains to some extent the successes of the players.

A heatmap for the bivariate correlation coefficients is shown in Figure 2, which shows that several variables, like per-capita GDP, are positively correlated with the advancements of the players. At the same time, there are a bunch of variables, like the ability to control corruption or the government expenditure on education as a percentage of GDP, and the female business and legal index that are negatively related to the players' performance; that is, if the investigated country performs better in terms of these dimensions, then the advancements of that country's players are expected to decline. Hence, even though economic and social well-being shape sport successes, the direction of their impact is unclear.

A multiple regression has also been set up based on the bivariate correlations; the outcomes of the multiple regression are set out in Table 2. In this case, the (i) development of the infrastructure is represented by the variable access to electricity, (ii) economic well-being in terms of per-capita GDP, the (iii) openness of the economy in terms of import volume index, while government expenditure on education and the ratio of female to male workers are intended to capture (iv) alternative educational and (v) employment opportunities. These variables have been chosen because they exhibit at least a moderately strong relationship with the advancements of the players (see Table 1) and none of them exhibits elevated levels of multicollinearity with the remaining explanatory variables (all VIF-values are under 3); since the majority of economic indicators are highly correlated with one other, special attention is to be devoted for any potential multicollinearity. It is worth mentioning that control of corruption has a so strong effect on the players' success as it suppresses the effect of economic variables; after incorporating this variable into the model, the coefficient of per-capita GDP changes its sign. The (within) R^2-Values for the total prize money, for the prize money per match, and the normalized points are $R^2 = 0.37$, $R^2 = 0.46$ and $R^2 = 0.50$, respectively, and based on the associated F-values, all models possess sufficient explanatory capability.

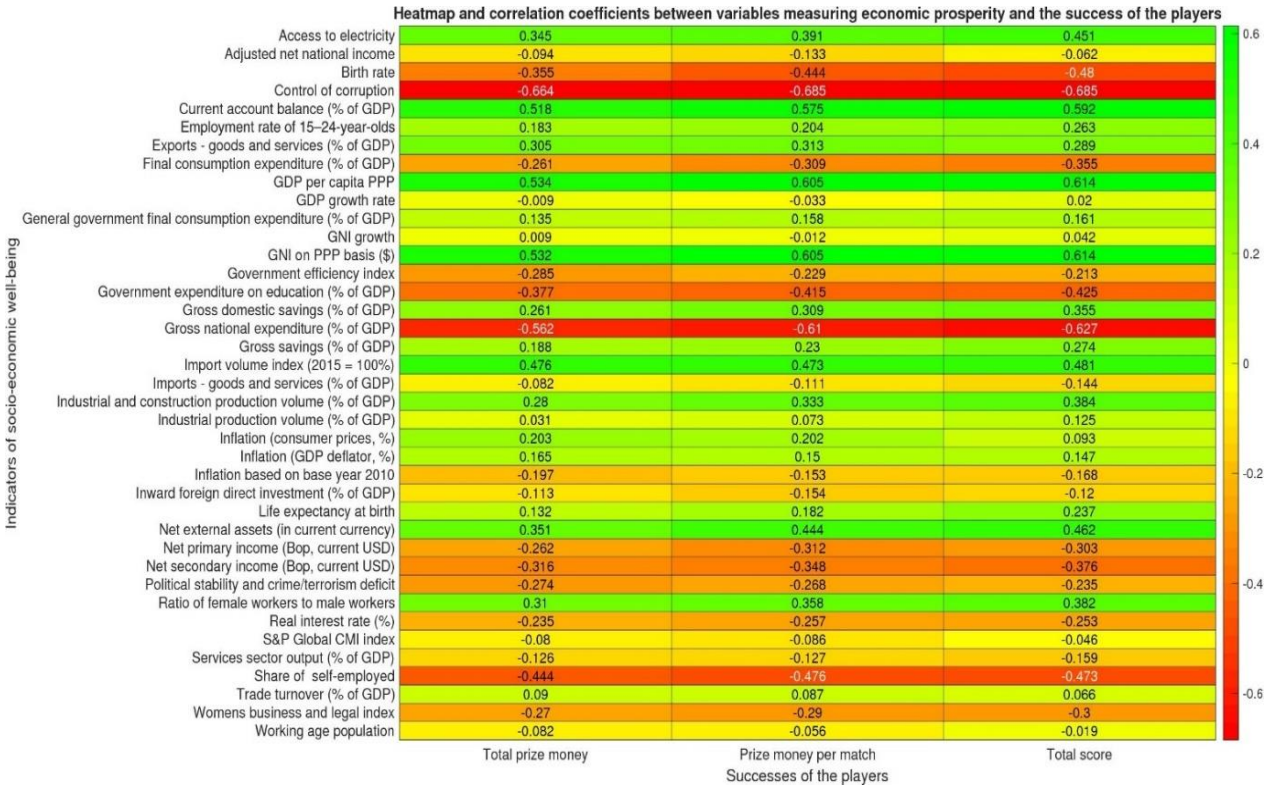

Figure 2. Heatmap for the bivariate correlation coefficients between the macroeconomic indicators and the players' successes. The legend on the strength of the correlations is shown on the right-hand side of the Figure.

Table 2. Variables in the multiple regression, along with their coefficients, the standard error of the coefficients, the t −ratio, and the p −value used to assess their significance.

Dependent variable: total prize money $R^2 = 0.37; F(5, 44) = 6.661; p < 0.001$				
Variable	**Coefficient**	**Std. error**	**t −ratio**	**p −value**
Constant	-1.175e+06	2.897e+06	-0.406	0.687
Access to electricity	4661.22	271912.2	0.167	0.868
GDP per capita	61.745	35.079	1.760	0.085*
Government expenditure on education (% of GDP)	-375067	167127	-2.244	0.030**
Import value index	13744.3	8703.56	1.579	0.122
Ratio of female to male workers	10127.2	12722.3	0.796	0.430
Dependent variable: prize money per match $R^2 = 0.46; F(5, 44) = 9.517; p < 0.001$				
Variable	**Coefficient**	**Std. error**	**t −ratio**	**p −value**
Constant	-11391.5	37946.3	-0.300	0.7654
Access to electricity	106.631	365.532	0.292	0.772
GDP per capita	1.125	0.459	2.449	0.018**
Government expenditure on education (% of GDP)	-6271.44	2188.65	-2.865	0.006***
Import value index	140.255	113.980	1.231	0.225
Ratio of female to male workers	141.238	166.608	0.848	0.401
Dependent variable: normalized points $R^2 = 0.50; F(5, 44) = 10.811; p < 0.001$				
Variable	**Coefficient**	**Std. error**	**t −ratio**	**p −value**
Constant	-0.303	0.376	-0.805	0.425
Access to electricity	0.003	0.004	0.898	0.374
GDP per capita	1.017e-05	4.555e-06	2.233	0.031**
Government expenditure on education (% of GDP)	-0.065	0.022	-2.996	0.005***
Import value index	0.001	0.001	1.308	0.198
Ratio of female to male workers	0.002	0.002	1.105	0.275

Relationships marked with *** are significant at the 1% significance level, relationships marked with ** are at the 5% significance level, while relationships marked with * are at the 10% significance level.

DISCUSSION

Considering the results showcased in Table 1 and Table 2, no clear-cut decision could be reached as to whether macroeconomic development and elevated levels of social well-being foster or tapper off the players' achievements, as some of the studied indicators are positively associated with players' performances, while others are negatively associated. Even though these results seem to contradict one another, one might argue that a certain level of macroeconomic well-being is crucial for success, underpinned by the positive relationships. On the other hand, following the arguments by previous studies, players from less developed environments might be more motivated to reach outstanding results that allow them to elevate their social status, as evidenced by several variables associated negatively with success (7, 28). Hence, one might argue that two effects drive the advancements of the players. While economic well-being seems to nurture sport successes, alternative educational or job opportunities might diminish the players' motivation to succeed, and as such, the two primary drivers of advancements shape the players' success in opposite directions. It should also be mentioned that the most potent effect on the players' advancements is the ability to control corruption; however, the negative bivariate correlation paradoxically suggests that the better corruption is controlled, the worse results are expected.

Positive Correlations. The variables exhibiting a positive relationship with the players' advancements include the current account balance, per-capita GDP, GNI on a PPP basis, gross domestic savings (% of GDP), import volume index, industrial and construction production volume, current value of net foreign assets, and access to electricity. Most of these indicators are highly correlated with one another as well, and are economic variables related to the financial performance of the country, its role in international trade, and the development of its infrastructure. By suggesting that a certain level of well-being is pivotal to succeed, these variables seem to support one of the key conclusions drawn by a previous study, that argues that 'the higher the budget, the better the results' (8), and partially align with the findings stemming from Varmus et al. (2022) as well (7).

The positive association with these variables suggests that market-based economic performance and more developed infrastructure might significantly contribute to more prosperous outcomes. A prior study found a positive association between economic prosperity and sporting success (3), while in the case of tennis, Varmus et al. (2022) witnessed a positive association between the GDP and the successes of the players (7); the authors in previous studies, however, also argue that sport is often considered as a tool to elevate social status in less promising environments (7, 28). A quite interesting finding is a moderately strong positive relationship with the ratio of female to male workers, which suggests that the more emancipated a society becomes, i.e. the greater the share of women in the labour market and the higher the diversity of women's roles in the society, the more likely is that a woman from that country will excel and achieves outstanding success in tennis. A possible explanation for this phenomenon is that as women are provided more opportunities, the self-confidence of players, which is proven to contribute to triumphs, is raised, yielding more outstanding results (29).

Negative correlations. While most indicators positively correlated with the players' advancements are related to the economic well-being in the investigated country, most variables that exhibit negative correlation with the players' success are related to the broader social well-being.

- Government consumption expenditure as a percentage of GDP: Since this indicator encompasses all current government expenditures for purchases of goods and services, significant government expenditures originate from significant tax revenues or debt. A large amount of redistribution customarily arises from a powerful centralisation, usually at the expense of market mechanisms that hinder sports success. Elevated levels of indebtedness, especially when not in domestic currency, usually lead to uncertainty, which also exposes the country to a country-specific risk premium; the aforementioned uncertainty seems to reduce the likelihood of any sport success.
- Gross national expenditures as a percentage of GDP: Increases in this indicator indicate more elevated levels of well-being. This outcome seems to contradict to the previous findings; as residents become richer and as the government spends more to foster social well-being, sport is not considered any more as a viable way to 'break-out' from poverty and as such, the motivation of the players to excel seems to be diminished, which is manifested later on in less successful career paths (28).
- General government expenditure on education: the findings suggest that the more money is spent on education, the less likely it becomes that a female tennis player will excel and reach superior performance. One might argue that increasing educational expenses provides a broader range of possibilities to excel, and as such, impressive performance in sports is not considered the single viable way to succeed (28).

Elevated levels of the three aforementioned indicators suggest a more promising standard of living. A recent study argues that players from less developed economies might 'perceive a sports career as a significant progress in [their] social status' (7). Hence, these outcomes trigger the conclusion that while economic well-being is nurtures, elevated living standards somewhat diminish sports advancements.

Related to the socio-political development of the countries, the following indicators also exhibit a negative relationship with the players' success.

- Birth rate per 1,000 people: The data unveil that higher birth rates are associated with declining performance of the players; however, this variable certainly has a lagged effect on sport advancements. In addition, political interventions, like China's former one-child policy, accounted for several profound social and economic challenges (30). Up to now, no reliable explanation for the direction of this relationship could be developed; therefore, subsequent analysis is needed to discover the nature of this relationship.
- Control of corruption: An estimated indicator with high values indicating that corruption is controlled strictly in a country. Corruption in the field of sports is studied extensively (31) and is usually accompanied by a significant counterselection of future talents since the investments and possibilities required to start a professional career are granted by corrupt decision-makers, who do not necessarily favour the most talented players; instead, candidates who manage to bribe the decision-makers are granted viable opportunities. This counterselection, however, significantly harms any further triumphs, and as a previous study pinpoints, ' the damage done by problematic agents eventually translates into poor performance on the field' (32). Nepotism is also considered an additional form of corruption

that results in special attention devoted to less talented family associates or friends who subsequently fail to perform well (33). Paradoxically, players stemming from countries where corruption is more prevalent seem to outperform players originating from countries where corruption does not play a pivotal role. Considering these findings, the outcomes deserve particular attention in further studies.

- Percentage of self-employed (as a percentage of total employment): even though, Lechner and Downward (2017) found some empirical pieces of evidence that sports participation is associated with more flourishing outcomes on the labour market, increases or steadily high shares of self-employment are usually the result of either unbearable public burdens or less promising offers on the labour market, both forcing several people to work as self-employed (34). Whichever phenomenon leads to increases in self-employment, it carries some social risk, ultimately manifested in less successful career paths. In addition to that, Tahir and Burki (2023) argue that entrepreneurship plays a significant role in boosting the economic development of the BRICS economies (35). Consequently, potential future talents might choose the more prosperous way of starting their enterprise rather than striving to maintain a less promising sports career.
- Women's Business and Legal Index Score: It tracks how regulations, laws, and ordinances affect women's prosperity, so 100 represents the highest possible score. A positive relationship was detected in the ratio of female to male workers, but this index shows a negative correlation with the advancements of the players. This phenomenon is likely to reflect that as women are provided more opportunities to succeed, they become less motivated to strive for outstanding sports advancements (36).

Outcomes of the Multiple Regression. While Zheng et al. (2018) call attention to the fact that appropriate sport policies are urgently needed (37), the outcomes of multiple regression model provide solid evidence to conclude that a certain level of well-being, indeed, is also needed to expect flourishing results. While roughly half of the variance of the (normalized) points could be explained based on the per-capita GDP and the government expenses on education, the prize money could be predicted with a significantly higher uncertainty. Since the bulk of other variables capturing economic well-being are at least moderately correlated with GDP, their effect on advancements in sports is similar to the effect of GDP. On the other hand, increasing the expenses on education decreases the likelihood of advancements or the likelihood that players will earn a triumph. While access to electricity, import value index and the ratio of female to male workforce exhibit a moderately strong bivariate correlation with the advancements of the players, these variables remain insignificant in a multiple regression setting which triggers the conclusion that two mechanisms drive advancements in the fields of sports: economic prosperity and the alternatives offered on the labour market, especially opportunities to be educated. While the former one fosters, the latter tappers off sport successes. However, elevated levels of well-being usually yield more prosperous possibilities in the labour market (36). Therefore, while a positive effect of economic well-being on sport successes in the short term might be anticipated, in the long run, these beneficial effects seem to be diminished by more viable alternatives offered on the labour market. These findings align with the prior findings, which argue that the choice between an academic and a sports career has an ample effect on how one's sports career progresses (28). Hence, in line with the findings stemming from Valenti et al. (2020), this paper also demonstrates that a certain level of well-being, indeed, is needed to expect outstanding sport successes (38). For instance, Post et al. (2018) argue that a certain level of wages is needed to ensure that parents are able to finance the costs associated with training (39). On the other hand, besides elevated levels of well-being, there are other significant factors that shape how the career of a potential future talent progresses especially in childhood. According to Haugen et al. (2024), ‘flexible schooling program during the teens, a supportive national tennis federation, and benevolent sponsors' are also crucial to excel’ (40), while Chen (2024) pinpoints the importance of a tournament system that 'allow athletes to move up the ranks through successive event levels' (41).

Limitations of the Study and Further Research Plans. Even though this research has shed light on several aspects of the players' successes, a more elaborate treatment of these relationships is needed in subsequent research. One of the study's main limitations is the missing data for 2022 and the subsequent years. The

missing data for several years also hinders the development of a panel structure for the dataset, even though investigating how the relationship between macroeconomic development and sports successes evolves could reveal some additional insights. Moreover, some indicators capturing the advancements achieved in the field of sport development are also to be incorporated into successive analyses, like the government expenses on sports, or the budget of national tennis associations, for which no reliable data could be obtained. The single player focus might also be extended in subsequent work; it should be noted, however, that in several cases, only a single player stemming from these countries managed to be ranked among the top 800 on the WTA rankings, which might also provide a somewhat biased picture of the relationship between players' advancements and their socioeconomic background. Further research is needed to address the question of what motivates the player when she has to choose between a traditional career path or striving for a professional career as a tennis player and to solve the 'corruption-paradox' by revealing why players stemming from societies where corruption is more prevalent tend to outperform their competitors.

CONCLUSION

Although the economic progress of the five countries forming the BRICS alliance is increasingly recognized in scientific literature, players stemming from these countries still possess a disproportionately low share among the top-ranked female tennis players. Therefore, this paper seeks to reveal whether the recent economic expansion of these countries predicts a higher success rate of their female tennis players based on the data encompassing the period 2012-2021. While the positive correlation between various macroeconomic indicators and the success of the players suggests that a certain level of well-being, indeed, is needed to expect outstanding results, several advancements in the field of socio-economic well-being seem to mitigate sports successes. Hence, after having reached a certain level of well-being, outstanding advancements in the field of sports are not considered any more as a prosperous way to elevate social status as with elevated levels of well-being, the opportunities offered on the labour market to earn a living might be more promising than striving for a victorious career 'on the court'.

APPLICABLE REMARKS

- A certain level of well-being is needed, but more prosperous opportunities outside the sports field might mitigate the players' motivations to excel.
- In order to nurture advancements in the field of elite sports, adequate sport policies are urgently needed with a certain level of well-being. Coach provision and developing a talent pool, a supportive national tennis federation, and benevolent sponsors are also crucial to excel.

AUTHORS' CONTRIBUTIONS

Study concept and design: Mihály Ormos, Gábor Kincses. Acquisition of data: Gábor Árva. Analysis and interpretation of data: Gábor Árva, Mihály Ormos, Gábor Kincses. Drafting the manuscript: Gábor Árva, Mihály Ormos. Critical revision of the manuscript for important intellectual content: Mihály Ormos, Gábor Kincses. Statistical analysis: Gábor Árva. Administrative, technical, and material support: Gábor Árva. Study supervision: Mihály Ormos.

CONFLICT OF INTEREST

The authors report no conflicts of interest.

FINANCIAL DISCLOSURE

None of the authors report any financial interest related to the material in the manuscript.

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ETHICAL CONSIDERATION

Exclusively public data have been processed, used, and reported. No personal data is stored during the investigation.

ROLE OF THE SPONSOR

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No AI-assistance has been used to prepare the manuscript.

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