Problem Chosen	2025 MCM/ICM Summary Sheet	Team Control Number
C		2509254

FEBLR Model:Olympic Prediction and Interpretation Model

Summary

The national medal table is always a topic of interest whenever it approaches. While past performance offers some clues, it's far from the only factor at play. To explain the factors influencing Olympic medals and predict the medal rankings for the 2028 Olympics in Los Angeles, we established the FEBLR Model.**(Factor Extraction and Binary Logic-based Regression Model)**

For the first sub-question of question 1, we constructed a linear regression model. We first pre-processed the data, removing countries that do not exist now and selecting the eigenvalues: evaluation scores of the athletes, historical data of gold and total medals of each country, etc., and constructed a matrix of correlation coefficients between the eigenvalues and a factor model. We used K-means clustering to cluster the countries into sports powerhouses or not and regressed them backward step by step, and the R-squared of the models were all greater than 0.8, which reflects the fit. Our **Factor Extraction Regression Model** predicts that the top three results are USA (57 gold medals), China (36 gold medals), and Great Britain (26 gold medals).

For the second subquestion of Question 1, a **Binary Logic-based Regression** is constructed for the countries that have not won an award, picking features: athlete ratings, the country's participation, the number of medals in the program in the history of the country, etc. Then run a Binary Logistic Regression to find the probability of each athlete winning the award. We predict that there are 1,199 people who will be the first to win an award in 2028. And we calculate the probability that a country that hasn't won a prize will win the prize.

For the third sub-question of question 1, we counted the number of projects set and countries winning in each session, then calculated the Pearson correlation coefficient, we used a color chart to visualize the data, using the US, New Zealand, and France as examples, and finally found that the most relevant project for France is Cricket. We used the factor scores to assist in showing that countries are good at which types of programs.

For problem 2, we collected the medals won in the program before and after multiple great coaches joined a country. The features were selected to fit the average rating of the country's players in that sport, their participation in the program, etc., to the number of gold medals and the total number of medals they won, in a stepwise backward regression. Then the vif was tested to make sure that the covariance was not severe and to check that there was no strong correlation between residuals and features. We choose Chinese track and field, Japanese swimming and French diving to carry out, and conclude that French diving can reach 8 winners and 5 gold medals after introducing great coaches, while Chinese track and field and Japanese diving can have 14 awards.

Finally, we learned that whether or not an economy is developed has a positive impact on performance, and that great coaches can contribute to program awards. Our model successfully predicts medal table figures for 2028, and also informs sports resources and policy changes.

Key words: Olympics, Medal table predictions, FEBLR Model, The "great coach" effect

Contents

I. Introduction 3
1.1 Problem Background 3
1.2 Restatement of the Problem 3
1.3 Analysis of Specific Issues 4
II. Assumptions and Reasons 5
III. Symbols 6
IV. Question One:2028 Los Angeles Medal Table 6
4.1 Solution Strategy 6
4.2 Data Preprocessing 7
4.3 Model Establishment 8
4.4 Model Evaluation 10
4.5 Result Analysis and Processing 12
V. Question Two:Regarding the winner of the first medal 12
5.1 Solution Strategy 12
5.2 Data Preprocessing 13
5.3 Model Establishment 13
5.4 Model Evaluation 13
5.5 Result Analysis and Processing 14
VI. Question Three:Sports events and national medals 14
6.1 Solution Strategy 14
6.2 Data Preprocessing 15
6.3 Model Establishment 15
6.4 Result Analysis and Processing 15
VII. Question Four:The "Great Coach" Effect 16
7.1 Solution Strategy 16
7.2 Model Establishment 16
7.3 Model Evaluation 16
7.4 Result Analysis and Processing 17
VIII.Question Five 18
IX. Evaluation and Promotion 19
9.1 Strength 19
9.2 Weakness and Promotion 19
X. References 19

I. Introduction

1.1 Problem Background

The Olympic Games is the world's largest comprehensive sports meeting, and the medal charts in the game can always be the focus of attention from various countries. The number of medals in a country in the conference often symbolizes the sports strength of the country, and even reflects the national comprehensive strength, and the medal list is born. Before each meeting, people will always speculate who will get the gold medal, who will get the medals, and which country can be. This guess is often based on the results of the athletes who participated in the meeting, and there are historical data to a certain extent. In order to have more accurate conjecture and prediction, we need to build some models to help us solve this problem.

1.2 Restatement of the Problem

We needed to complete a relevant prediction about the medal table of the next Olympic Games with limited data support. We were provided with historical medal data, participation and performance of participating athletes, program setup and other data. Considering the context of the problem, we will have the following specific tasks:

- Develop a linear regression model to predict the number of gold medals and the total number of medals for each country for the 2028 Los Angeles Games and assess the uncertainty of this prediction.
- Predicting the probability of a first award for countries that have not medaled and the likelihood of an athlete's first award.
- Correlation between the number and type of programs and the number of national awards, thus illustrating the national strengths of the program.
- Examining the "great coaches" effect, i.e. the impact of changes in top coaches on changes in the number of national medal tables.

1.3 Analysis of Specific Issues

1.3.1 Analysis of Problem 1

Predicting the 2028 Los Angeles medal table data is one of our most critical tasks. In order to achieve this goal, we need medal data from previous years' participation of countries as a way to get the trend of the medal table. We build a prediction model through linear regression equations based on previous medal data divided by different variables.

Regarding the influencing factors on the number of medals, the variables with the strongest correlation are: the number of participating athletes, whether the participating countries are unified with the home countries, and how developed the countries are. By characterizing these variables, we construct a regression model for prediction.

1.3.2 Analysis of Problem 2

With the sport, many countries that have never won medals are also likely to medal in the future. To predict this possibility, we need to screen countries that have not won medals, use logistic regression models, and build predictive models with data from countries participating in the competition.

For the factors that affect the medals of these countries, the characteristics with strong correlation are: athlete score, year, country participation, whether it is male, and the number of medals in the event in the history of the country. We build regression model predictions based on these characteristic variables.

1.3.3 Analysis of Problem 3

Different countries must have different advantages, so the project setting of the meeting is related to the distribution of the medal table. Through statistics of project setting and awards in various countries in history, we quantify data, take specific countries and projects as examples, and study the impact of changes in project setting characteristics on the medal table.

1.3.4 Analysis of Problem 4

The influence of coaches on athletes is undoubtedly great. Under the condition of changing coaches, we need to quantify the impact of coaches on athletes and establish regression models to evaluate the impact of coaches on the medal table. The related variables are: the year, the average score of a certain event in a certain country, the number of participants, the country's participation in the event, and so on.

II. Assumptions and Reasons

- **Assumes that the data provided is complete and accurate.** Actual data such as historical medal counts, number of events, number of athletes, etc. may be missing or inaccurate, but it is assumed that this data can be reliably used in the prediction model after preprocessing.
- **It is assumed that the model is universally applicable to every country.** Despite our categorization of countries with different levels of development, there are still differences between countries. We assume that differences between countries can be matched by entries and that the accuracy of the model is appropriate for all countries.
- **It is assumed that a linear relationship exists between the number of medals and the characteristic variables.** In the regression model for predicting 2028 medals, it is assumed that these variables conform to a linear relationship with the number of medals in order to simplify the model and to specify the medal influencing factors.
- **It is assumed that the individual characterization variables are independent of each other.** In practice, there may be some correlation between the characteristic variables. To simplify the model, we assume that the correlation of these variables is negligible.
- **Assume the relevance of changes in athlete data.** Athletes change in each edition, which affects the actual data in the medal table. Since we have no way of knowing the specifics of the participants in 2028, we take the athlete data in the model to be closely correlated with 2024.
- **Stability of coaching instruction is hypothesized.** In the Great Coach effect, coaches' instruction of athletes varies as athletes change. Although we cannot account for the complexity and multiplicity of real-world situations, in our model, coaches' instruction of athletes is stable.

III. Symbols

Symbols	*Definition*
Y_i	Number of medals or gold medals
X_i	Refers to multiple independent variables and changes according to the topic
β_i	regression coefficient
σ	constant

IV. Question One: 2028 Los Angeles Medal Table

4.1 Solution Strategy

Through the data, it can be found that with the growth of the year, the number of medals has a large difference, and the year will also affect the batch of athletes, so we decided to use the latest data and use linear regression to fit the Olympic data of various countries in 2024, About the choice of xi: the evaluation score of the athlete, whether it is a developed country, the average number of gold medals and total medals in the country in the past three years and the past ten years. Athlete's evaluation score: 5 points for each gold medal, 3 points for each silver medal, and 1 point for each bronze medal. We then used the model to predict data for 2028.

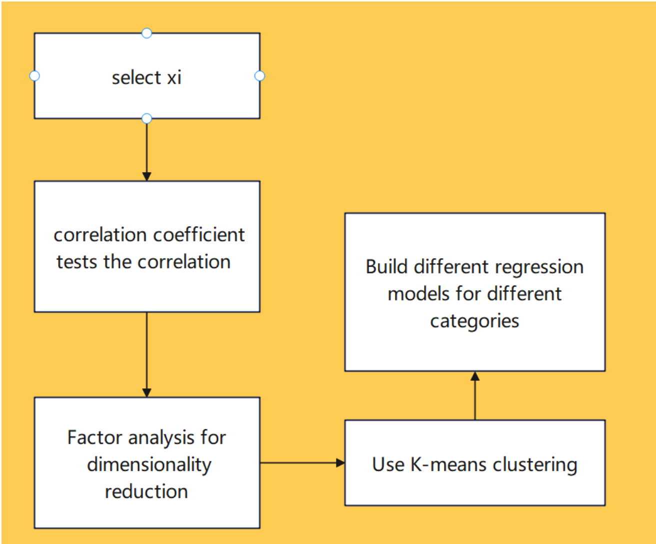


Figure 1 Train of thought flow chart

4.2 Data Preprocessing

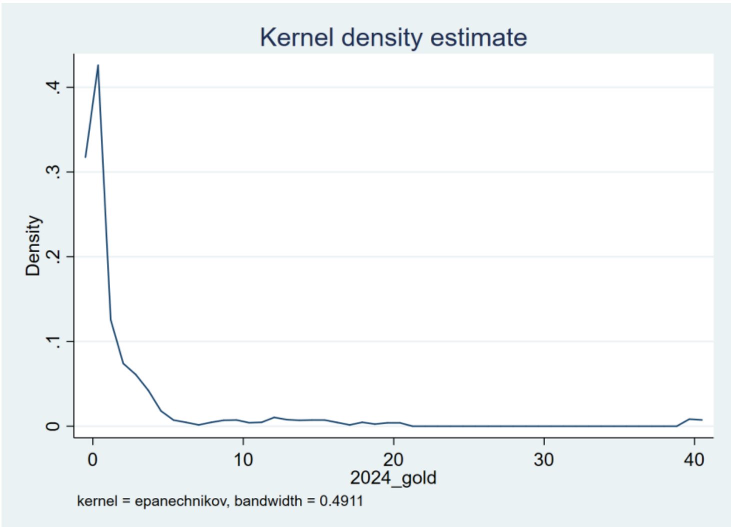
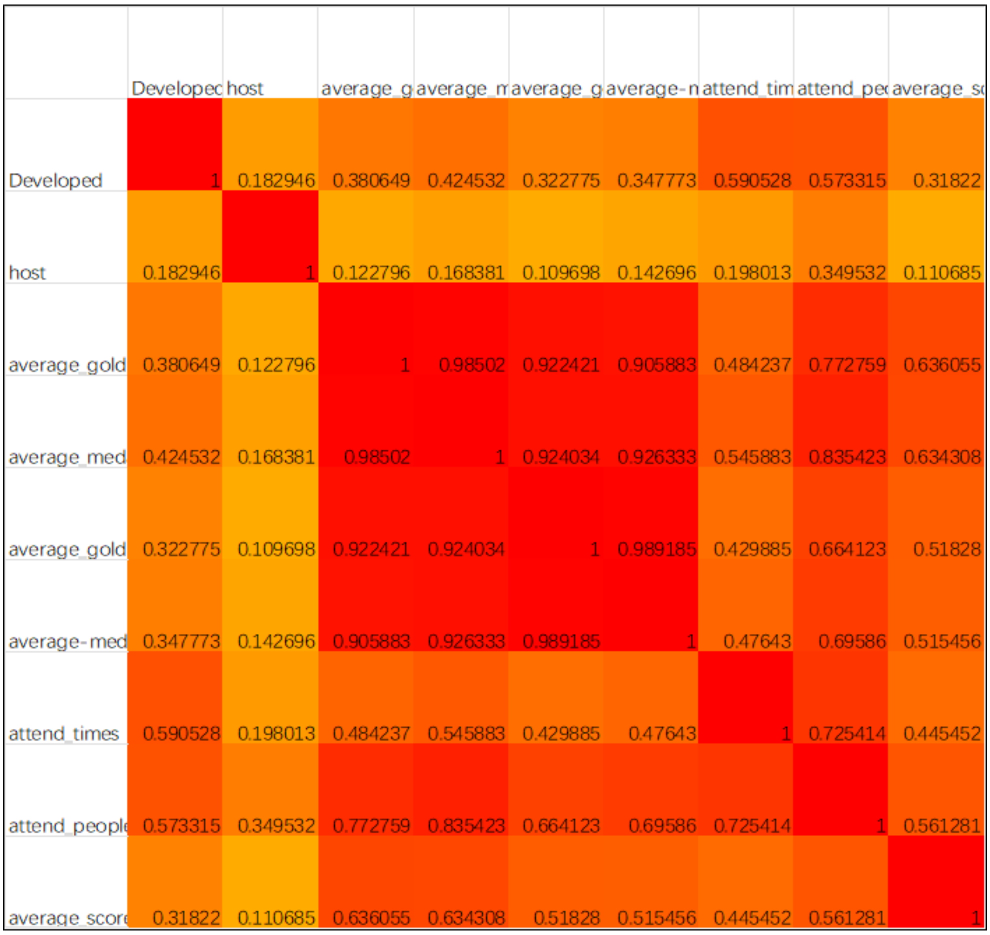


Figure 2 Kernel density edtimate

As can be seen from the kernel density map, the distribution of medals is extremely uneven, and most of them are concentrated in positions below 5. Therefore, we decided to use k-means clustering to divide the data into two categories. They are sports developed countries (China, the United States, the United Kingdom, Japan, Germany, Russia) and sports non-developed countries, and use regression to predict the number of gold medals and medals in 2028.



	Developec	host	average_g	average_m	average_g	average-n	attend_tim	attend_pe	average_sc
Developed	1	0.182946	0.380649	0.424532	0.322775	0.347773	0.590528	0.573315	0.31822
host	0.182946	1	0.122796	0.168381	0.109698	0.142696	0.198013	0.349532	0.110685
average_gold	0.380649	0.122796	1	0.98502	0.922421	0.905883	0.484237	0.772759	0.636055
average_med	0.424532	0.168381	0.98502	1	0.924034	0.926333	0.545883	0.835423	0.634308
average_gold	0.322775	0.109698	0.922421	0.924034	1	0.989185	0.429885	0.664123	0.51828
average-med	0.347773	0.142696	0.905883	0.926333	0.989185	1	0.47643	0.69586	0.515456
attend_times	0.590528	0.198013	0.484237	0.545883	0.429885	0.47643	1	0.725414	0.445452
attend_peopl	0.573315	0.349532	0.772759	0.835423	0.664123	0.69586	0.725414	1	0.561281
average_scor	0.31822	0.110685	0.636055	0.634308	0.51828	0.515456	0.445452	0.561281	1

Figure 3 Pearson correlation coefficient matrix tests the correlation between

From Figure 2, we can see that the multicollinearity between the eigenvalues is very serious, so we choose the factor method to reduce dimensionality.

Select two factors. According to their loading and meaning, the variable with higher loading of factor 1: average_gold(3years) (0.898), average_medal(3years) (0.879), average_gold (0.950), average_medal (0.927), these variables are all related to " number of medals" (especially gold medals and total number of medals), so factor 1 can be interpreted as "Medals Performance Factor", a factor related to the average number or performance of gold medals and medals. Variables with higher loadings on factor 2: attend_people (0.749), average_score (0.573), attend_times (0.925). The meaning of factor 2: These variables are related to the "participation and activity factor" and can be interpreted as being related to the number of participants, average Factors related to scoring and participation.

4.3 Model Establishment

In density estimation, K density is dense above 5 and dispersed below 5, with multiple independent variable factors for the number of gold medals. Get the correlation coefficient plot, we can see that the correlation between variables is very serious. Multiple linear regression equations can be established and model evaluation can be carried out. According to the characteristics of countries, we divide them into two categories, namely sports developed countries and sports non-developed countries, and use regression to predict the number of gold medals and medals in 2028.

Gold Medal Return of Non-Sports Developed Countries

equation：

$$Y_1 = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_0$$

$$\beta_1 = 5.83 \ \beta_2 = 2.10 \ \beta_3 = 1.94 \ \beta_0 = 2.18 \quad Vif = 1.3$$

equation：

$$Y_2 = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_0$$

$$\beta_1 = 17.51 \ \beta_2 = 7.36 \ \beta_3 = 3.09 \ \beta_0 = 7.47$$

Gold Medal Return of Sports Developed Countries

equation：

$$Y_3 = \beta_1 X_1 + \beta_2 X_2 - \beta_0$$

$$\beta_1 = 5.83 \ \beta_2 = 5.23 \ \beta_0 = 5.91$$

equation：

$$Y_4 = \beta_1 X_1 + \beta_2 X_2 - \beta_0$$

$$\beta_1 = 17.85 \ \beta_2 = 18.88 \ \beta_0 = 23.84$$

Table 1 Independent variable and Dependent variable

variable	Y_i	X_1	X_2	X_3
practical	Number of gold	Whether developed	Number of	Average number of

significance	medals	countries	medals	participants

4.4 Model Evaluation

Table 2 Model checking

inspection data	Y_1	Y_2	Y_3	Y_4
Prob	0	0	0	0.0121
R^2	0.7957	0.8666	0.8666	0.9472
RMSE	1.4161	3.4195	3.4195	13.191

Model 1：Prob = 0 R^2 = 0.7957 close to 1 RMSE = 1.4161

It shows that the fitting degree of the regression equation.

For variables, developed is a binary variable, and the value reaches 1.943707, which means that the economic level of the country has a strong positive impact on non-sports developed countries. For example, developed countries have an average of two gold medals more than non-developed countries. Factors 1 and 2 also have a significant impact on it.

Model 2：Prob = 0 less than 0.005 R^2 = 0.8666 close to 1 RMSE = 3.4195 approaching 0 compared to positive infinity

It shows that the fitting degree of the regression equation.

If Xi's P tests are all less than 0.005, the null hypothesis is rejected, indicating that the smaller the difference between the existing number of medals and the predicted number of medals, the more reliable the predicted data. Developed reaches 3, because he is a binary variable means that when other variables are equal, Developed countries There are 3 more gold medals than non-Developed countries.

Model 3：Prob = 0 R^2 = 0.8666 RMSE = 3.4195 approaching 0 compared to positive infinity

It shows that the fitting degree of the regression equation.

If Xi's P tests are all less than 0.005, the null hypothesis is rejected, indicating that the smaller the difference between the number of existing medals and the number of predicted medals, the more reliable the predicted data Developed reaches 3, because he is a binary variable means that when other variables are equal, Developed countries have more medals than non-Developed countries regress

Model 4：Prob = 0.0121 less than 0.05 R^2 = 0.9472 is closer to 1 than the above model RMSE = 13.191approaching 0 compared to positive infinity

It shows that the fitting degree of the regression equation.

In the X1p test of the variable, p = 0.1797 is greater than the significance level of 0.05, indicating that this variable is eliminated in the stepwise regression, and the variable with weak correlation with the original equation y shows that in developed sports countries, the number of medals has no strong significance with the economic level of this country.

F1 and F2 show a strong correlation in the regression equation, that is, the historical average number of gold medals and the average number of participants in the developed country have a strong positive impact on the number of medals predicted by the country in 2028.

We use the establishment of regression equations, and choose the variable selection of stepwise backward regression, which can lead to model complexity due to multivariate, and can gradually eliminate insignificant variables in the process of establishment, and at the same time enhance the universality of the model for variable interpretation. As the number of variables increases, the complexity of model training and calculation usually increases exponentially. Stepwise backward regression only considers eliminating one variable at each step, and does not need to calculate and compare all possible variable combinations like full subset regression, which is more efficient.

By gradually eliminating variables that do not contribute significantly to the model, the interference of some irrelevant or redundant variables to the model can be avoided, so that the model can focus more on capturing information that is really related to the dependent variable, thereby improving the prediction accuracy of the model. Too many variables may lead to unstable estimation of model parameters, and different sample data may make parameter estimates fluctuate. Stepwise backward regression can screen out the variables that have a greater impact on the dependent variables and are relatively stable, so that the estimation of model parameters is more stable and the reliability of the model is improved.

4.5 Result Analysis and Processing

For sports developed countries, it can be seen that the difference between the regression coefficients of the pre-models of factor1 and factor2 is small, and it is not significant whether they are developed countries (China is the only underdeveloped country in sports developed countries). For sports non-developed countries, the number of gold medals is greatly influenced by whether they are developed countries or not (other conditions are equal, developed countries have two more gold medals than non-developed countries). At the same time, for non-developed countries, the "medal performance factor" is significantly higher than the "participation and activity factor", which may reflect that these countries focus more on increasing the number of medals in resource allocation, rather than increasing the number of participants and events.
The predicted rankings for 2028 are listed in the appendix.

V. Question Two:Regarding the winner of the first medal

5.1 Solution Strategy

Establish a player winning probability model and set five xi: year, how many times you have participated, the number of programs set by the athlete's sports in that year, the rating of the athlete, and whether he is a male. Then test whether there is multicollinearity between the variables. If VIF is less than 3, it is established. Next, a binary logistic regression model is established. If p<0.05, the model is established.

X	x_i	n
First medal candidate number	The probability that contestant I who has never has never won an medal	The number of candidate who has never won an medal

$$X = \sum \frac{x_i}{n} \times n = \sum x_i$$

5.2 Data Preprocessing

We list the following parameters, X1 is the year, X2 is how many times they have participated in the past, X3 is the total number of programs set for different events in each year, and the score of x4 is the comprehensive score of the player's previous awards (every first gold medal plus five points, every silver plus three points, bronze medal 1 point), and then screen out, the player with zero score (who has not won an award), whether the x5 setting is male

Then establish a binary logic, and regress to obtain the probability of each person winning the prize

5.3 Model Establishment

$$y = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \sigma$$

$$\beta_1 = 0.003 \ \beta_2 = -0.162 \ \beta_3 = -0.15$$

$$\beta_4 = 0.296 \ \beta_5 = 0.078$$

$$\sigma = -7.016$$

Number of estimates of uninvited awards: 1200 people

5.4 Model Evaluation

We took 80% of the known data as the training group, the remaining 20% as the test group, and the probability of answering correctly in the remaining 20% is 73.9%.

		p	Exp(B)
step 1[a]	Year	.325	1.003
	times	.000	.850
	all_medals	.000	.985

	score	.000	1.344
	Sex=F	.001	1.081
	constant	.199	.001

The significance of the year, the number of sessions, athletes in the past awards have an impact on the regression equation.

Exp (B) is the exponential power of the regression coefficient. It can be seen from the figure that the year of holding has almost no effect on the first award of athletes (only athletes who have not won awards are discussed here). The more athletes participate in the number of sessions, the probability of athletes winning awards will increase to a certain extent. The previous awards of athletes are positively correlated with whether they can win awards in the next session.

		95% confidence interval for EXP (B)	
		lower limit	upper limit
step 1[a]	Year	.997	1.008
	times	.832	.869
	all_medals	.984	.987
	score	1.324	1.365
	Sex=F	1.031	1.133
	constant		

5.5 Result Analysis and Processing

Based on the data, it is calculated that 172 people will win the first medal in the next year. The probability of this estimate is 7.36%.

VI. Question Three:Sports events and national medals

6.1 Solution Strategy

We first use factors, extract ten factors according to the gravel chart, and then explain what these ten factors are, and then look at the factor scores of each national event, auxiliary instructions, which event each country is good at, and then we pick Four countries, China, the United States, New

Zealand, and France, made the total number of medals and the Pearson correlation coefficient of the awards set in each year, and drew its color scale. The darkest color description is the most relevant item.

6.2 Data Preprocessing

Set a given number and type of sports

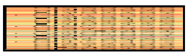
KMO sampling suitability quantity = 0.669, so the given number of items is suitable for factor

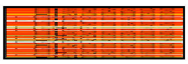
The list gets the common factor variance extraction of each item Most of them are above 0, 75, then you can continue, in the SPSS exploratory factor, the component cut-off to 10 cumulative value is greater than 75%, and observe that there is only one inflection point in the gravel plot, rotate the component matrix.

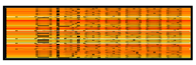
Then establish a binary logic, and regress to obtain the probability of each person winning the prize

6.3 Model Establishment

We first use factors, extract ten factors according to the gravel chart, and then explain what these ten factors are, and then look at the factor scores of each national event, auxiliary instructions, which event each country is good at, and then we pick Four countries, China, the United States, New Zealand, and France, made the total number of medals and the Pearson correlation coefficient of the awards set in each year, and drew its color scale. The darkest color description is the most relevant item. Choose 3 countries, the United States, New Zealand, and France as examples.

the United States: 

New Zealand: 

France: 

6.4 Result Analysis and Processing

It can be found that New Zealand is the darkest color. Taking him as an example, rugby is the most important to New Zealand. In this event, New Zealand has shown that the number of medals far exceeds other events. Therefore, the home country should choose the most popular sport in the country as the competition in order to win more gold medals.

VII. Question Four:The "Great Coach" Effect

7.1 Solution Strategy

We first collect the data of 4 great coach pairs, take the number of medals and gold medals obtained by their events as y, and then set the number of times X1 country has participated in this event (a total of several times in history), the year X2 The number of participants, X3 whether there is a great coach in the year, X4 athletes average score, and then test the relationship between vif and residuals and variables.

7.2 Model Establishment

Table

y	β_1	β_2	β_3	β_4
Gold or medal	Whether_great coach	Average_candidate_score	Candidate_number	Attend_time

$$y_{gold} = \beta_0 + \beta_1 \bullet x_1 + \beta_2 \bullet x_2$$

y_{goal}	β_1	β_2	β_0
	4.26	1.47	1.03

$$y_{medal} = \beta_0 + \beta_1 \bullet x_1 + \beta_2 \bullet x_2 + \beta_3 \bullet x_3 + \beta_4 \bullet x_4$$

y_{medal}	β_1	β_2	β_3	β_4	β_0
	3.74	2.58	0.17	0.14	-0.88

7.3 Model Evaluation

7.3.1 Test endogeneity

```
. correlate residuals greatcoach average_score
(obs=51)

             | residu~s greatc~h averag~e
-------------+---------------------------
   residuals |   1.0000
  greatcoach |  -0.0000   1.0000
average_sc~e |  -0.0000   0.2896   1.0000
```

Figure Residual Test

The correlation between residuals and independent variables was calculated, and the correlation coefficient was less than 0.0001, which can confirm that the model is not endogenous.

7.3.2 Test multicollinearity

Mean VIF（gold）	Mean VIF（medal）
1.09	1.73

The VIF is less than 3, indicating that there is basically no multicollinearity

7.4 Result Analysis and Processing

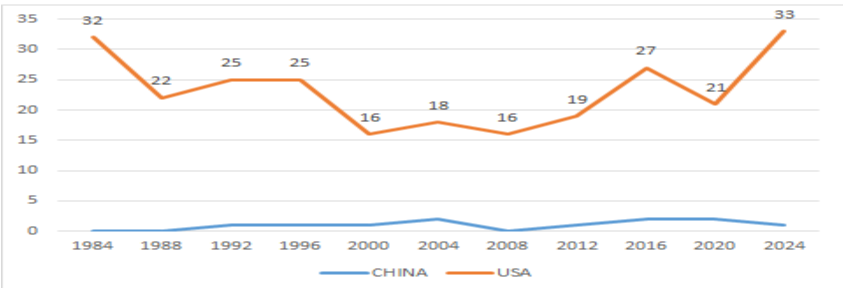


Figure Athletics China and USA

For the changes after the introduction of great coaches in three events, we selected Chinese track and field, Japanese swimming and French diving. Taking Chinese track and field as an example, the reason for the selection is that China is approaching the United States in terms of gold medals and the number of medals. However, events such as track and field are still very different. We use the model to estimate the three events in three countries in 2028 after the introduction of great coaches.

NOC	sports	sum_gold	sum_medal
CHN	Athletics	5	15
JPN	Swimming	6	14
FRA	Diving	5	8

Figure predict 2028 three program score

VIII. Question Five

1.The strongest prediction variable shows that the non -developed sports will invest more resources into individual outstanding athletes, and it is obviously weaker than the medal score factor in the participation factor (illustrates the number of participants, the number of participants, etc.).

2. For the great coach effect, if the great coach exists 1 unit, the number of gold medals or medals will be 4.26 units, which means that the level of coach or training may play a decisive role in the performance of the athletes. The effect of the great coach shows that the basic ability and performance of the athletes are important, but in high -level competitions, the guidance and strategy of coaches can often play a more direct and significant role.

It can be seen that the performance of the country in the Games has a strong relationship with the country's strength. Whether it is economically developed or whether it can afford great coaches, the committee should pay attention to players in poor countries and give them to some extent. For example, please be an excellent coach before the game.

IX. Evaluation and Promotion of Model

9.1 Strength

Our model first for different countries clustering, grouping modeling, so the model can fit the data of each country, at the same time we select a number of eigenvalues and factor, so our model has good interpretability and small error. Secondly, the eigenvalues we choose include both national factors and the scores of each athlete, which can better fit the data.

9.2 Weakness and Promotion

Our model is fitted from the data of 2024, so the trend of the time dimension is not captured enough. In the future, the change of the time dimension can be used as part of the model to further improve the performance of the model.

X. References

[1] Xu Lun Hui,Luo Qiang,Fu Hui.Car following safe distance model based on braking process of leading vehicle f [J].Journal of Guangxi Normal University(Natural Science Edition),2010,28(1):1-5.

[2] https://www.bbc.com/sport/olympics/19253531

[3] https://idrottsforum.org/bucgor_matheson-dodd190412/

Report on Use of AI

1. OpenAl ChatGPT(Nov 5, 2023 version, ChatGPT-4,)

   Query1: <insert the exact wording you input into the Al tool>

   Output: <insert the complete output from the Al tool>

2. OpenAl Ernie (Nov 5, 2023 version, Ernie 4.0)

   Query1: <insert the exact wording of any subsequent input into the Al tool

   Output: <insert the compete output from the second query>

3. Github CoPilot (Feb 3, 2024 version)

   Query1: <insert the exact wording you input into the Al tool>

   Output: <insert the complete output from the Al tool>

4. Google Bard(Feb 2, 2024 version)

   Query: <insert the exact wording of your query>

   Output: <insert the complete output from the Al tool>

XI. Appendix

rank	NOC	Country	gold	MEDAL
1	USA	United Stat	57	176
1	CHN	China	36	110
1	GBR	Great Britai	26	82
1	GER	Germany	23	73
1	JPN	Japan	22	69
1	FRA	France	21	72
1	AUS	Australia	18	64
1	ITA	Italy	17	58
1	NED	Netherland	12	43
1	CAN	Canada	11	40
1	KOR	South Kore	10	35
1	HUN	Hungary	8	31
1	ESP	Spain	7	31
1	NZL	New Zealar	7	27
1	SWE	Sweden	7	25
1	BRA	Brazil	6	27
1	UKR	Ukraine	5	23
1	POL	Poland	4	22
1	BEL	Belgium	4	17
1	SUI	Switzerland	4	17
1	CUB	Cuba	3	17
1	DEN	Denmark	3	16
1	NOR	Norway	3	14
1	ROU	Romania	2	15
1	CZE	Czech Repu	2	13
1	KEN	Kenya	2	13
1	IRL	Ireland	2	10
1	FIN	Finland	2	9
1	JAM	Jamaica	1	11
1	UZB	Uzbekistan	1	11
1	BUL	Bulgaria	1	10
1	GEO	Georgia	1	10
1	KAZ	Kazakhstan	1	10
1	TUR	Turkey	1	10
1	CRO	Croatia	1	9
1	GRE	Greece	1	9
1	SRB	Serbia	1	9
1	AUT	Austria	1	8
1	ISR	Israel	1	8
1	RSA	South Afric	0	8
1	ARG	Argentina	0	7
1	EGY	Egypt	0	7
1	HKG	Hong Kong	0	6
1	IRI	Iran	0	6
1	AZE	Azerbaijan	0	5
1	MEX	Mexico	0	5
1	SLO	Slovenia	0	5
1	BLR	Belarus	0	4
1	COL	Colombia	0	4
1	ETH	Ethiopia	0	4
1	IND	India	0	4
1	KOS	Kosovo	0	4
1	GRN	Grenada	0	3
1	INA	Indonesia	0	3
1	SVK	Slovakia	0	3
1	UGA	Uganda	0	3
1	FIJ	Fiji	0	2
1	POR	Portugal	0	2
1	THA	Thailand	0	2
1	ARM	Armenia	0	1
1	BAH	Bahamas	0	1
1	DOM	Dominican	0	1
1	ECU	Ecuador	0	1
1	LTU	Lithuania	0	1
1	NGR	Nigeria	0	1
1	PRK	North Kore	0	1
1	SGP	Singapore	0	1

BRU	0.15157
BHU	0.14967
BIH	0.14967
CHA	0.14594
COD	0.14594
COK	0.14594
COM	0.14594
CRT	0.14594
ESA	0.14594
FSM	0.14594
IVB	0.14181
NBO	0.13694
AND	0.13475
GBS	0.12798
KIR	0.1232
LAO	0.1232
SOM	0.1232
SSD	0.1232
NEP	0.12151
NFL	0.12151
GAM	0.11994
MYA	0.11888
ANG	0.11694
ANT	0.11694
NCA	0.11281
CAF	0.10997
CAM	0.10997
CAY	0.10997
CGO	0.10997
SLE	0.10959
SOL	0.10959
ROT	0.10806
RWA	0.10806
LBA	0.10664
BIZ	0.10532
ARU	0.10385
SEY	0.09474
SKN	0.09474
SAA	0.0934
SAM	0.0934
HON	0.08286
MHL	0.08286
MLI	0.08286
MLT	0.08286
BEN	0.07712
BOL	0.07712
GUI	0.07712
GUM	0.07712
LIE	0.07712
MAD	0.07712
MAW	0.07712
MTN	0.07712
ASA	0.07134
BAN	0.07134
MDV	0.07134
NRU	0.0706
OMA	0.0706
PLE	0.0706
PLW	0.0706
PNG	0.0706
RHO	0.0706
VIN	0.0706
VNM	0.0706
YAR	0.0706
YEM	0.0706
YMD	0.0706
GEQ	0.06635
LES	0.06635
MAL	0.06635
LBN	0.06132
LBR	0.06132
STP	0.03267
SWZ	0.03267
TLS	0.03267
TUV	0.03267
UNK	0.03267
VAN	0.03267