### 中英双语论文撰写（可直接复制至论文）

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### \*\*变量标明 | Variable Definitions\*\*

\*\*中文\*\*

1. \*\*东道主（Host）\*\*：二元变量，当国家在某届奥运会中为主办国时取值为1，否则为0。

2. \*\*新增项目（NewEvent）\*\*：二元变量，当某项目在该届奥运会中首次被引入时取值为1，否则为0。

3. \*\*奖牌总数（Total）\*\*：某国家在某届奥运会某项目上获得的金、银、铜牌总数。

4. \*\*国家固定效应（C(NOC)）\*\*：用于控制不同国家在体育传统、资源投入等方面的固有差异。

5. \*\*年份固定效应（C(Year)）\*\*：用于控制不同年份奥运会规模、参赛人数等时间相关因素。

\*\*English\*\*

1. \*\*Host\*\*: Binary variable, 1 if a country is the host of the Olympic Games in a specific year, 0 otherwise.

2. \*\*NewEvent\*\*: Binary variable, 1 if a sport is introduced as a new event in that year, 0 otherwise.

3. \*\*Total\*\*: Total medals (gold, silver, bronze) won by a country in a specific sport and year.

4. \*\*Country Fixed Effects (C(NOC))\*\*: Controls for inherent differences in sports traditions and resource investments across countries.

5. \*\*Year Fixed Effects (C(Year))\*\*: Controls for temporal factors such as the scale of the Olympics and participant numbers.

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### \*\*模型设计 | Model Design\*\*

\*\*中文\*\*

为探究东道主效应与新增项目对奖牌数的影响，构建如下固定效应回归模型：

\[

\text{Total} = \beta\_0 + \beta\_1 \text{Host} + \beta\_2 \text{NewEvent} + \beta\_3 (\text{Host} \times \text{NewEvent}) + \text{C(NOC)} + \text{C(Year)} + \epsilon

\]

- \*\*交互项（Host × NewEvent）\*\*：检验东道主是否在新增项目中具有额外优势。

- \*\*控制变量\*\*：通过国家与年份固定效应排除非观测异质性。

\*\*English\*\*

To investigate the host effect and the impact of new events, we construct a fixed-effects regression model:

\[

\text{Total} = \beta\_0 + \beta\_1 \text{Host} + \beta\_2 \text{NewEvent} + \beta\_3 (\text{Host} \times \text{NewEvent}) + \text{C(NOC)} + \text{C(Year)} + \epsilon

\]

- \*\*Interaction Term (Host × NewEvent)\*\*: Tests whether hosts gain additional advantages in new events.

- \*\*Controls\*\*: Country and year fixed effects address unobserved heterogeneity.

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### \*\*模型推导 | Model Derivation\*\*

\*\*中文\*\*

1. \*\*数据预处理\*\*：

- 合并运动员、东道主及项目数据，过滤未获奖记录。

- 标记新增项目（首次出现的年份）及东道主国家。

- 按国家-年份-项目聚合奖牌数，控制历史总奖牌数以排除“零奖牌国家”。

2. \*\*模型选择\*\*：

- 使用普通最小二乘法（OLS），因变量为奖牌总数（此处指某个国家在某一年单个项目的总共奖牌数），自变量包括Host、NewEvent及其交互项。

- 国家与年份固定效应通过虚拟变量实现，消除跨时空系统性偏差。

\*\*English\*\*

1. \*\*Data Preprocessing\*\*:

- Merge athlete, host, and sport data; filter non-medal records.

- Flag new events (first occurrence year) and host countries.

- Aggregate medals by country-year-sport, excluding countries with zero historical medals.

2. \*\*Model Selection\*\*:

- Ordinary Least Squares (OLS) with Total Medals （这个地方要加一点东西，详情看中文）as the dependent variable.

- Country and year fixed effects via dummy variables to eliminate spatiotemporal biases.

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### \*\*结论分析 | Conclusion Analysis\*\*

\*\*中文\*\*

1. \*\*新增项目效应（Host × NewEvent）\*\*：

- β₃ = 6.5168，p值 = 0.0017。若显著，表明东道主在新增项目中具有战略优势，可能因提前布局训练资源（Bernard & Busse, 2004）。

3. \*\*政策启示\*\*：

- 东道主可通过优先发展新增项目提升奖牌表现。

\*\*English\*\*

1. \*\*New Event Interaction\*\*:

- β₃ = [Data to fill], p-value = [Data to fill]. If significant, hosts strategically dominate new events, possibly due to early resource allocation (Bernard & Busse, 2004).

3. \*\*Policy Implication\*\*:

- Hosts may prioritize new sports to maximize medal outcomes.

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### \*\*可视化建议 | Visualization Guide\*\*

\*\*中文\*\*

1. \*\*系数图（Coefficient Plot）\*\*：

- 横轴为变量（Host, NewEvent, Host×NewEvent），纵轴为回归系数，误差线表示95%置信区间。

- 示例代码：

```python

import seaborn as sns

sns.pointplot(x=results\_df["Variable"], y=results\_df["Coefficient"], errorbar=("ci", 95))

```

2. \*\*交互效应图（Interaction Plot）\*\*：

- 展示东道主与非东道主在新增项目中的奖牌差异。

- 示例代码：

```python

sns.barplot(x="Host", y="Total", hue="NewEvent", data=medal\_counts)

```

\*\*English\*\*

1. \*\*Coefficient Plot\*\*:

- X-axis: Variables (Host, NewEvent, Host×NewEvent); Y-axis: Coefficients with 95% CI error bars.

- Code:

```python

sns.pointplot(x=results\_df["Variable"], y=results\_df["Coefficient"], errorbar=("ci", 95))

```

2. \*\*Interaction Effect Bar Chart\*\*:

- Compare medal counts between hosts and non-hosts in new vs. existing events.

- Code:

```python

sns.barplot(x="Host", y="Total", hue="NewEvent", data=medal\_counts)

```

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### \*\*参考文献 | References\*\*

1. Balmer, N. J., Nevill, A. M., & Lane, A. M. (2003). Do judges enhance home advantage in the Olympic Games? \*Journal of Sports Sciences\*, 21(3), 129-134.

2. Bernard, A. B., & Busse, M. R. (2004). Who wins the Olympic Games: Economic resources and medal totals. \*Review of Economics and Statistics\*, 86(1), 413-417.

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\*\*注\*\*：用户需根据实际回归结果填写β系数与p值，并替换可视化代码中的数据字段。