



The Three-way Duel

By Zilai Li

Three antagonists, Larry, Mo and Curly, are engaged in a three – way duel. There are two rounds. In the first round, each player is given one shot: first Larry, then Mo, and then Curly. After the first round, any survivors are given a second shot, again beginning with Larry, then Mo, and then Curly.

For each duelist, the best outcome is to be the sole survivor. Next best is to be one of the two survivors. In third place is the outcome in which no one gets killed. The worst outcome is to be killed.

Larry is a poor shot, with only a 30 percent chance of hitting a person at whom he aims. Mo is a much better shot, achieving 80 percent accuracy. Curly is a perfect shot – he never misses.

What is Larry’s optimal strategy in the first round? Who has the greatest chance of survival in this problem?

Answer on Page 3

Remembering Paul Samuelson

By Jason Yu

Are you sitting in your econ class right now? If you are, then you most likely have Paul Samuelson, unofficially known as the “Father of Modern Economics,” to thank for shaping the fundamentals of your education in a broad assessment of economic theory. Samuelson’s lasting influence on Keynesian economic theory, teaching, and application continued right up until his death on December 13th, 2009, at the age of 94.

Born in the small Midwestern town of Gary, Indiana, in 1915, American economist Paul Samuelson quickly became one of the most influential economists of last half of the 20th century. Graduating with a PhD in Economics from Harvard in 1941, Samuelson went on to teach at the Massachusetts Institute of Technology (MIT) and mentor a new era of influential economists such as Robert Solow, Paul Krugman, and Joseph Stiglitz. His achievements in a wide range of economic theory, from macroeconomics to finance to consumer behavior, culminated in the distinction of being named the first American Nobel Prize Economics Laureate in 1970.

Perhaps one of Samuelson’s best known achievements is in shaping how economics is taught to millions of students around the world. His *Economics: An Introductory Analysis*, initially published in 1948, continues to be one of the best selling economics textbooks of all time. Paul Krugman recently described the textbook as “an extraordinary work: lucid, accessible without being condescending, and deeply insightful.” It has ultimately become a model for how to standardize introductory courses in economics.

Samuelson is best described as a “generalist” who completed extensive research in many different areas of economics. His influence on the field of mathematical economics, however, is especially important. According to his Nobel Prize biography, Samuelson was frustrated by what he felt were “contradictions, overlaps, and fallacies, in the classical language of economics.” It was his belief that mathematics was the key to both unifying and clarifying what had been colloquially known as the “dismal science.” In his first major, *Foundations of Economic Analysis*, in 1947, Samuelson proved to the world that mathematics could indeed serve as a powerful tool to better understanding economics.

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The Relationship between Olympic Ranking and Economics

By Song Yoon

Executive Summary

In 2008, Beijing hosted the summer Olympics. This essay examines how the economic power of countries affected the rankings at the Beijing Olympic games. There are some economic indicators such as population, unemployment rate, GDP growth rate, and GDP Per Capita that may have an effect on Olympic ranking and dummy variables of the regression model will classify communist countries and lists of continents. We can see that the majority of the top ten ranks at the Olympics have strong economic background. For example, in the Beijing Olympics, China was first place and the United States was second in terms of amount of medals won. The U.S and China have the first and second largest Gross Domestic Product (GDP) in the world, respectively. From the regression model, we can see that GDP is almost the whole story in Olympic success. GDP is the only economic indicator which affects Olympic Games ranking significantly. Being a part of Oceania and Europe also affects Olympic ranking positively and strongly.

Introduction

The results of Olympic Games has become a resource depicting the economic power of nations, and winning medals is the goal towards which all nations strive.

Even though the International Olympic Committee (1996) claimed ‘the Olympic Games are competitions between athletes in individual or team events and not between nations’, nations typically act in a manner that is more consistent with the perception that they are in competition against each other. The ranking of nations according to total medals won is reported in the media, serving as a source of national pride or disappointment for citizens. The question is: how closely are economic indicators related to the Olympic Games ranking. A similar question would be, what other reasons and factors result in some countries performing better than others. Population should play an essential role in determining the ranking in Olympic Games. Larger countries have a wider pool of talented athletes and thus a greater chance at fielding medal winners. A large population by itself, however, is not satisfactory to guarantee more medals. The population of India is more than one billion (which is sixteen percent of the population of the world) but not many Indian athletes participated in the Olympic Games. Therefore, we need to consider GDP per Capita as well because we know that well-trained athletes with sufficient sponsorships by the government affect the ranking at the Olympic Games. In the Beijing Olympics, there were some countries which won many medals unexpectedly such as Jamaica. It is extraordinarily difficult to explain this phenomenon with models. These studies have also revealed the importance of some other explanatory variables such as dummy variables representing communist countries and continents; America, Europe, Asia, Oceania, and Africa.

Data

Our primary source for these measures is the World Bank and the U.N. There were some difficulties in acquiring the data from communist countries such as North Korea, so CIA factbook is used. The data are adopted from 2007. The ranking of Beijing Olympics 2008 is obtained from International Olympic Committee (IOC) official website.

Model

$(200 - \text{Actual ranking}) = B_0 + B_1 * \text{GDP growth rate} + B_2 * \text{GDP} + B_3 * \text{GDP per capita} + B_4 * \text{Population} + B_5 * \text{Unemployment rate} + B_7 * \text{Communism} + B_8 * \text{America} + B_9 * \text{Oceania} + B_{10} * \text{Europe} + B_{11} * \text{Asia}$

Analysis

Surprisingly, we cannot really see strong relationship between Olympic ranking and the economic indicators except GDP. Through probabilities of variables, GDP is the only significant economic indicator for Olympic success. The coefficient of GDP is 0.0044 and t-statistics is 2.6 so the coefficient of GDP is significant at 95%

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Three-way Duel: Answer...

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Answer:

To find out Larry's optimal strategy, let's take a look at all the possible options that Larry has.

1. Larry shoots at Mo. If he hits then it becomes Curly's turn to shoot, and he never misses. Therefore, Larry will sign his own death warrant.
2. Larry shoots at Curly. If he hits then it is Mo's turn. This means Larry only has 20 percent chance to survive.
3. Since neither of the above options is attractive to Larry, his best strategy is to fire up in the air! In this case Mo will shoot at Curly and if he misses, Curly will shoot and kill Mo. Then it becomes the second round and it is Larry's turn again. Larry's shooting percentage is 30 percent, which means he has 30 percent chance to kill Curly and survive.

To find out the person who has the greatest chance of survival, we should not only look at their shooting abilities but also whom they threaten. A weak player who threatens no one may end up surviving if the stronger players kill each other off. Curly, although he is the most accurate, has the lowest chance of survival, only 14 percent. (Both Larry and Mo will shoot Curly first, so Curly has 70 percent chance to survive in the first round and 20 in the second: $0.7 \times 0.2 = 0.14$). Mo has 56 percent chance of winning (if Mo misses, he will be killed by Curly; if he kills Curly, he has 70 percent chance to survive when Larry shoots him, so the probability of surviving is; $0.8 \times 0.7 = 0.56$); and by using the best strategy above, Larry can turn his 30 percent accuracy into a 41.2 percent chance of winning (can you do the calculation by using the similar reasoning above?)

The moral here is that small fish may do better by passing on their first chance to become stars. We see this every four years in presidential campaigns. When there are a large number of contenders, the leader of the pack often gets derailed by the cumulative attacks of all the medium – sized fish. It can be advantageous to wait, and step into the limelight only after the others have knocked each other and themselves out of the running.

Remembering Paul Samuelson

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His work in mathematical economics paved the way for new advances in financial economics, especially in the efficient-market hypothesis and options pricing. While such topics have lately become controversial with the onset of the economic meltdown, Samuelson understood that conditions necessary for efficient markets rarely, if ever, existed. According to *The Economist*, he later declared that “free markets do not stabilize themselves. Zero regulating is vastly suboptimal to rational regulating. Libertarianism is its own worst enemy!”

The extent of Paul Samuelson's lasting influence is difficult to describe. Certainly no other modern American economist has had as much impact in shaping the way we think about economics as Samuelson has. So whether you are in class or about to go to class, remember Paul Samuelson. Just don't blame him for your midterm!

The Relationship between Olympic Ranking and Economics Con't...

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confidence level. We measure GDP in billions. So, when GDP increases by one billion, the value of '200 - Olympic ranking' increases 0.0044. We can see that population is not an important factor to win more medals at the Olympic Games, as was proposed above.

It is an interesting result that GDP per capita is statistically insignificant. When GDP per capita of a nation is high, it means the nation invests more capitals for sport infrastructures and welfare so there are more well-trained athletes. It is actually not true in this regression. The correlation between GDP and GDP per capita is 0.313. They are not strongly correlated so higher GDP per capita does not guarantee high ranking.

The dummy variables are communism and the lists of continents; Asia, North and South America, Europe, Africa, and Oceania. First, we would like to see if there is a difference of Olympic ranking between communist countries and non-communist countries. This dummy is statistically insignificant therefore communism does not have an effect on the ranking. Second, the question is whether there is any premium for being a part of a particular continent. Europe and Oceania are strongly significant; t-stat=0.0478, 0.0468, respectively, at 95% confidence interval. Coefficients of Europe and Oceania are 22.1 and 36.1. So, we can say that being a member of Europe or Oceania positively affects Olympic ranking.

Conclusion

Overall, economic indicators did not really affect the Olympic ranking in Beijing. To understand further about the significances of the variables in the regression, we should look up some surprises in Beijing Olympic Games. First, GDP per capita of nations which are within 20th rank fluctuate greatly. For example, GDP per capita of China(\$2485), Ukraine(\$3029), Jamaica(\$4012), Kenya(\$786), and Ethiopia(\$245) are low compare to top ten GDP per capita countries such as U.S.A(\$45790), Canada(\$40222), and France(\$41523), yet all of these were found in the top twenty. Second, Population is not a statistically significant variable. Belarus was 16th in rank and yet there are only 9.7 million people in Belarus. In addition, Australia was 6th rank in the Olympics, but in population is ranked only 54th (in the world), and finally, Jamaica was 13th in rank at the Olympics, but only 139th in population rank. GDP growth rate and unemployment rates have huge variations for each country (even in the top twenty) so these are completely insignificant variables. These interesting facts lead to the unexpected results that happen at each Olympic game. Thus, measuring ranking using solely economics indicator is a limited estimate.

Through dummy variables, we can see the significance of Europe and Oceania at the Olympic Games. The reason why is: we can assume that GDP of European and Oceania countries are quite similar or not much different. In contrast, GDP of Asian and American countries vary greatly. Our weaknesses are the lack of observations and that the whole set of observations are from only the Beijing Olympic games only. If there were more data from past Olympics, the estimation of this paper would be more accurate. As a whole, GDP of the nation is the most significant variable to determine the ranking of Beijing Olympic games.

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Questions, Comments, Concerns?

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