

## Is the Thucydides Trap Relevant to the Rise and Fall of the Ottoman Empire? A Cliometric Analysis

By Gregory T. Papanikos\*

*One of the most complex issues in history is explaining how great powers emerge and, eventually, how they decline and disappear. The first written explanation of the rise and fall of great empires was offered by the "Father of History," Herodotus, in the 5<sup>th</sup> century BCE. Among many other topics, he sought to explain the rise and fall of the great powers of his time, such as the Persian Empire, the Median Empire, the Egyptian Kingdoms, and others. His main thesis attributed the rise and fall of these great powers to individual charisma and divine intervention and fate. Thucydides, writing later in the same century, offered a different perspective. He emphasized material conditions and the dynamics of relative power: as one power emerges, it challenges the established great power. War is highly probable unless the established power yields to the demands of the emerging power. This situation has come to be known as the Thucydides Trap, a concept revisited in this century to describe the alleged antagonism between the emerging power of China and the established power of the United States. I apply this theory of rising and falling great powers to the Ottoman Empire, which emerged in the 13<sup>th</sup> century and was dissolved in the early 20<sup>th</sup> century, primarily due to its economic and military competition with the emerging power of England after the 15<sup>th</sup> century. I adopt a cliometric approach, relying on available quantitative data to test the theory. Specifically, I examine the territorial extent of the Ottoman Empire and the GDP per capita of England to quantify the level of their greatness during this 600-year period. The evidence suggests that the Ottoman Empire reached its peak just before the First Industrial Revolution, which occurred in Europe, primarily in England, in the mid-18<sup>th</sup> century. Thereafter, the empire began to decline, and by the end of the Second Industrial Revolution in 1912 and World War I in 1918, the Ottoman Empire had effectively dissolved, eventually being replaced by Türkiye in 1923.*

**Keywords:** Ottoman Empire, Türkiye, England, Industrial Revolution, Great Powers, Cliometrics

### Introduction

Herodotus, writing in the mid-5<sup>th</sup> century BCE, sought to explain the rise and fall of great powers up to his time. Cicero called Herodotus "the father of history" because his *histories* is the first surviving written work that attempts to define what history is all about. In the opening sentence of his first book, named after the Muse Clio (Κλειώ), he introduces himself as "Herodotus the Thurian," referring to the Greek city of Thuria in southern Italy, even though he was born in the Greek city of Halicarnassus in Asia

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Minor. He wanted to write about human actions that were "great and admirable" (μεγάλα και θαυμαστά), lest they be forgotten as time passes. In his unique way, he combined hard facts with alleged narratives—some of which he himself doubted—about the rise and fall of great powers, and primarily the great wars, particularly the conflicts between the ancient Greeks and the "barbarians."<sup>1</sup> Herodotus emphasized the personality of the leaders as the driving force behind the rise and fall of great powers. He also used a metaphysical explanation attributed many historical events to divine intervention or fate (good or bad luck). Wars could be explained by cultural differences and the ambitions of the various leaders.

Thucydides had a different view. He believed that wars were the result of conflict between an emerging power and an established power. As the emerging power rises, the existing power must either come to terms with this and retreat from world dominance or enter a war, which can either be won or lost. The best recent example of a peaceful transition from one superpower to another is the one that occurred between England and the USA. There was no war between England and the US. Examples of wars between emerging and established powers abound in history, with the most recent being the conflicts involving Germany<sup>2</sup> and its allies during the First and Second World Wars.

This cause of wars or changing world leadership in general was called by Graham Allison (2017a, 2017b) Thucydides' Trap and is currently applied to the alleged conflict between US-China. I apply this concept of the Thucydidean Trap to the rising and the fall of the Ottoman Empire. The Ottoman Empire was an emerging power in the 15<sup>th</sup> and 16<sup>th</sup> century challenging primarily the Byzantine Empire where it succeeded and some European powers where it failed to conquer. It stayed alive for 600 years from 1300 to 1923 when it collapsed and a small part of it became the Republic of Türkiye. In this paper I emphasize the fall rather than the rising of the Ottoman Empire using a cliometric approach, i.e., a quantitative approach to history.

This paper is organized as follows, including this introduction. The second section of the paper discusses very briefly the Thucydides' trap. The third section presents a discussion of the summary statistics to be used in this study. The fourth section tests, using the available quantitative data, the Thucydidean hypothesis that as the England was emerging the Ottoman Empire was declining through a series of wars primarily between the Ottomans and the English. At the end, the first world war led to complete

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<sup>1</sup>The term "barbarians" was used by Herodotus to distinguish between civilized and uncivilized nations. Herodotus believed, and clearly stated, that the war between the Greeks and Persians was a conflict between Europe and Asia because they had different civilizations. It is interesting to note that Marx, in his Communist Manifesto, used the same term to distinguish between civilized and barbarian nations: "The bourgeoisie, by the rapid improvement of all instruments of production, by the immensely facilitated means of communication, draws all, even the most barbarian, nations into civilization." This is highly relevant to the discussion in this paper because many in England and Europe, when they came into conflict with the Ottoman Empire, used this Herodotean argument that the Ottomans were uncivilized, especially as the empire was in decline. Of course, the real reason was different and had to do with the Thucydidean trap, as is shown in this paper.

<sup>2</sup>Germany is of great interest to the theory of the rise and fall of great powers. Germany was an emerging power that inevitably came into conflict with another great power, England, but it never won. However, Germany has remained one of the great powers to this day. This study does not compare this case. Similarly, Athens lost the war to Sparta, but it continued to be a great power until the early Byzantine years.

collapse of the Ottoman Empire as it fought against England and its allies. The last section concludes.

### The Thucydides Trap

Thucydides (460–c.400 BCE) wrote a historical masterpiece focusing on the Peloponnesian War, a conflict between Athens and its allies and Sparta and its allies. This was a civil war among the "civilized" Greek states, with the involvement of "barbarians" being indirect and peripheral. According to Herodotus's definition of national identity, these states shared a common identity: they were Greeks, united by the same blood, language, religion, and way of life, as I have explained in Papanikos (2024). Consequently, Thucydides found Herodotus's explanation of wars inapplicable to this context. He had to develop another theory—and he did.

Thucydides' book *The Peloponnesian War* encompasses much more than just accounts of military conflicts. It includes an excellent narrative on democracy, exemplified by the well-known Pericles' *Funeral Oration*. It also features a profound dialogue between the Athenians and the Melians, illustrating how one should navigate negotiations between unequal powers—a striking example of realism in international relations. Additionally, Thucydides provides a vivid description of the pandemic that struck Athens during the first year of the Peloponnesian War. I have written extensively about democracy as portrayed by Thucydides and other scholars of ancient Athens; see Papanikos (2016, 2017, 2020a, 2022a, 2022b, 2022c, 2025). Furthermore, I have compared the ancient pandemic described by Thucydides with Covid-19 in my paper Papanikos (2020b).

The concept of the so-called 'Thucydides Trap' was first introduced in 2012 by Graham Allison in an article published in the *Financial Times*. The idea gained significant attention and was later expanded upon in Allison's book *Destined for War: Can America and China Escape Thucydides's Trap?* published in 2017. Thucydides is quoted as saying that:

"It was the rise of Athens and the fear that this instilled in Sparta that made war inevitable."

In a 2017 article, Allison elaborated on these ideas and identified five lessons from the Cold War to help avert a potential China-U.S. conflict.

In this paper, I examine the hypothesis of a Thucydidean Trap as developed in Allison's numerous publications. The hypothesis to be tested in this paper is as follows:

Did England's rise to power ultimately lead to conflict with the Ottoman Empire?

I will adopt a cliometric approach, a method of historical research that applies economic theory, quantitative data, and statistical techniques (Goldin, 2011). In fact, all time-series analyses in economics can be considered contributions to cliometrics.

The full citation from *The Peloponnesian War* is as follows (1.23.6):

The real, though unobserved unacknowledged, cause, I believe, was that the great growth of Athens frightened the Lacedaemonians and compelled them to fight.<sup>3</sup>

If one reads the preceding analysis in his book, it becomes evident that no power desired the war, and both sides attempted to avoid it. The key word is “ἀναγκάσαι,” which is translated as “compelled.” The meaning of this word, when considered alongside the context preceding the citation, is that the Athenians and Spartans were persuaded by their allies' arguments to enter the war.<sup>4</sup> Previously, they had been allies against a common enemy, Persia. I believe the concept of the “Thucydides Trap” is overly simplistic and likely misleading in analyzing Thucydides' explanation of the rise and fall of great powers. Developing a comprehensive Thucydidean theory of history lies beyond the scope of this study. Instead, we test the theory of the Thucydides Trap through a specific historical case study. Alternatively, we could have adopted a Herodotean approach, which would involve “telling names” and “sharing stories.” This would not constitute a scientific history but, at best, a philological contribution to the many existing works on the Ottomans and Easterners in general. I aim to apply the so-called Thucydidean Trap to the two great powers that emerged after the 15<sup>th</sup> century AD, using a cliometric analysis. However, I will also use the stylized facts of the Peloponnesian War to examine whether they apply to the conflict between England and the Ottoman Empire.

To apply the cliometric analysis, we need an economic theory, quantitative data, and advanced techniques to solve statistical problems. While I do not explicitly mention an economic theory here that accounts for wars in general or civil wars in particular, in my book (Papanikos, 2020a) on the Greek Civil War of the 1940s, I dedicate two chapters to theory: one on wars in general and the other on civil wars. For a discussion of historical methods from an economic theory perspective, see Papanikos (2020b).

This paper emphasizes quantitative data and the application of statistical techniques. The next section addresses the most challenging case of data availability: the Ottoman Empire.

## The Data Regarding the Ottoman Empire

The time period of interest here spans from 1300 to 1923. Unfortunately, no data exist that directly compare the strength of the Ottoman Empire with that of England. Most of the available information consists of qualitative descriptions, particularly of

<sup>3</sup>The original text, which I translated, is as follows: τὴν μὲν γὰρ ἀληθεστάτην πρόφασιν, ἀφανεστάτην δὲ λόγῳ, τοὺς Ἀθηναίους ἡγοῦμαι μεγάλους γιγνομένους καὶ φόβον παρέχοντας τοῖς Λακεδαιμονίοις ἀναγκάσαι εἰς τὸ πολεμεῖν. ([https://www.greek-language.gr/digitalResources/ancient\\_greek/library/browse.html?text\\_id=73&page=8](https://www.greek-language.gr/digitalResources/ancient_greek/library/browse.html?text_id=73&page=8)). The word “ἀφανεστάτην” is translated here as “unobserved,” which implies a certain degree of ignorance. If it were translated as “unacknowledged” or “kept secret,” it would suggest that people were aware of the true cause, which would not align with the spirit of Thucydidean analysis of history.

<sup>4</sup>This is one of many interpretations of the meaning of the phrase “ἀναγκάσαι εἰς τὸ πολεμεῖν”, see the dictionary: <https://www.greek-language.gr/digitalResources/ancientgreek/tools/liddell-scott/search.html?lq=%CE%B1%CE%BD%CE%B1%CE%B3%CE%BA>

political, technological, and national/international economic developments. There is an extensive body of literature on the history of England and the Ottoman Empire. However, it is not the purpose of this paper to engage with this literature.

My approach emphasizes the use of quantitative data over narratives or qualitative analyses, which forms the core of cliometric analysis. Much of the existing historical literature relies heavily on storytelling, reminiscent of Herodotean accounts, which are often challenging, if not impossible, to verify for accuracy. This approach does not constitute scientific history; at best, it represents good philological works.<sup>5</sup>

Since this paper examines the rise and fall of the Ottoman Empire, it is important to pinpoint its beginnings. The empire was founded by Osman I in 1299 in Anatolia (modern-day Turkey). Around the same time, in 1215, the Magna Carta was signed in England, introducing constitutional governance and the rule of law. This event initiated a series of political developments often credited with contributing to England's eventual leadership in industrialization some 500 years later. However, such claims, like many others regarding the two industrial revolutions, are difficult to substantiate. This difficulty explains the numerous answers to the question, "Why was England first?" The proliferation of answers to a single question is precisely what cliometrics seeks to avoid. By relying on empirical quantitative evidence, the number of plausible answers is significantly reduced, leading the scientific community to converge on a single, widely accepted explanation. This approach is followed in this study.

The challenge, then, is to find quantitative data from 1300 onwards for the two empires of interest. Ideally, we aim to compare the economic strength of these great powers using indicators such as GDP per capita. The Maddison Project Database (MPD), hosted by the University of Groningen, provides long time series of GDP per capita measured in 2011 US dollars based on Purchasing Power Parity (PPP). We use this data series for England, as it is continuous on an annual basis from 1252 onwards. This series is analyzed in the next section. Unfortunately, comparable data for the Ottoman Empire do not exist. Only a few years of data are available for Türkiye, as shown in Table 1.

The data reported in Table 1 are compared with the corresponding data for England in the same year in the next section of the paper. Here, we will highlight a few striking observations. First, 10 years before its collapse in 1913, the Ottoman Empire achieved its highest-ever GDP per capita of 1,473 US dollars. Second, the minimum value of 743 US dollars occurred before the empire's establishment in 1300. This presents an apparent paradox: the Ottoman Empire collapsed at the height of its economic development, as measured by GDP per capita. Figure 2 in the next section demonstrates that this contradiction can be explained by the widening disparity between England's GDP per capita and that of the Ottoman Empire. The concept of the Thucydides Trap should be understood in relative dynamic terms—in economic terms, both powers may rise, but the gap between them can widen, as is the case here. This idea is further explored in the next section.

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<sup>5</sup>In my book Papanikos (2020) on *What Is History*, I argue that cliometrics, or quantitative economic history, is a promising field for studying history without relying on narratives or personal opinions, i.e., subjectivism, relativism etc. It offers a scientific approach to analyzing historical phenomena and testing important hypotheses, such as the Thucydidean Trap. In this paper, I also adopt this method of historical analysis.

**Table 1.** *Türkiye's GDP per Capita in PPP (2011 US Dollars)*

| Year    | GDP per capita |
|---------|----------------|
| 1       | 897            |
| 1000    | 768            |
| 1150    | 743            |
| 1348    | 743            |
| 1450    | 781            |
| 1500    | 768            |
| 1650    | 832            |
| 1700    | 897            |
| 1750    | 923            |
| 1820    | 974            |
| 1870    | 1165           |
| 1913    | 1473           |
| 1918    | 832            |
| 1923    | 999            |
| Mean    | 914            |
| Maximum | 1473           |
| Minimum | 743            |

Source: Maddison Project Database (MPD)

This data series does not provide sufficient number of data to test the hypothesis of this study according to a cliometric approach. Instead, we are going to use the area of the Ottoman Empire as has been estimated by Sinecen et al. (2016). Table 1 reports the original data series that extends from 1300 to 1923. At the last three rows of Table 1, I report the average, maximum and minimum values. Table 3 also presents additional summary statistics of the area and GDP per capita.

**Table 2.** *Area of the Ottoman Empire (in thousands of square kilometers)*

| Year | Area | Change | Percentage Change |
|------|------|--------|-------------------|
| 1299 | 0    |        |                   |
| 1300 | 22   | 22     |                   |
| 1359 | 57   | 35     | 157%              |
| 1451 | 673  | 616    | 1077%             |
| 1481 | 1340 | 667    | 99%               |
| 1520 | 3630 | 2290   | 171%              |
| 1566 | 5253 | 1624   | 45%               |
| 1639 | 5188 | -65    | -1%               |
| 1672 | 5176 | -12    | 0%                |
| 1683 | 6791 | 1615   | 31%               |
| 1699 | 6332 | -459   | -7%               |
| 1718 | 6300 | -32    | -1%               |
| 1739 | 5818 | -482   | -8%               |
| 1774 | 5621 | -197   | -3%               |

|      |      |       |       |
|------|------|-------|-------|
| 1783 | 5560 | -61   | -1%   |
| 1792 | 5534 | -26   | 0%    |
| 1798 | 3816 | -1718 | -31%  |
| 1801 | 5257 | 1441  | 38%   |
| 1812 | 5208 | -49   | -1%   |
| 1817 | 5167 | -41   | -1%   |
| 1829 | 4944 | -224  | -4%   |
| 1830 | 4751 | -193  | -4%   |
| 1862 | 4751 | 0     | 0%    |
| 1878 | 4528 | -224  | -5%   |
| 1881 | 4362 | -166  | -4%   |
| 1882 | 2921 | -1441 | -33%  |
| 1912 | 2234 | -687  | -24%  |
| 1913 | 1985 | -249  | -11%  |
| 1913 | 2006 | 21    | 1%    |
| 1920 | 302  | -1704 | -85%  |
| 1923 | 815  | 513   | 170%  |
| 1924 | 0    | -815  | -100% |
| Mean | 3878 | 27    | 54%   |
| Max  | 6791 | 2290  | 1077% |
| Min  | 22   | -1718 | -85%  |

Source: Sinecen et al. (2016) and author's calculations.

Note: I included the years 1299 and 1924 to mark the beginning and the end of the Ottoman Empire. These two years are excluded from the calculation of the summary statistics in Tables 2 and 3.

**Table 3. Summary Statistics**

| <b>Statistic</b>         | <b>Ottoman Empire's Area<br/>(in thousands of square km)</b> | <b>Türkiye 's GDP per capita<br/>in PPP (2011 US dollars)</b> |
|--------------------------|--------------------------------------------------------------|---------------------------------------------------------------|
| Mean                     | 3878                                                         | 944                                                           |
| Standard Deviation       | 2083                                                         | 214                                                           |
| Coefficient of Variation | 54%                                                          | 23%                                                           |
| Range                    | 6769                                                         | 730                                                           |
| Minimum                  | 22                                                           | 743                                                           |
| Maximum                  | 6791                                                         | 1473                                                          |
| Count                    | 30                                                           | 11                                                            |

The story differs from the one described above regarding GDP per capita based on the data in Table 1. The maximum territorial extent of the Ottoman Empire was achieved in 1683, encompassing 6.79 million square kilometers. Conversely, its minimum size occurred at its inception in 1300, covering just 22 thousand square kilometers. The greatest territorial expansions occurred in the 15th and 16th centuries,

as indicated by the addition of significant areas to the Empire, reflected in substantial percentage growth.

By 1451, the Ottoman Empire controlled 673,000 square kilometers, a substantial increase compared to the 57,000 square kilometers in 1359. Within a century, the Empire's land area grew tenfold to 673,000 square kilometers, and over two centuries, it expanded another tenfold, reaching its peak size of 6.79 million square kilometers in 1683.

In the 18th and 19th centuries, the Ottoman Empire's territory began to decline, albeit with some fluctuations, particularly around 1683 and 1801. The territorial reduction recorded in 1920 was largely theoretical and should not be considered, as the Treaty of Sèvres, signed on August 10, 1920, between the Allied Powers and the Ottoman Empire, was never implemented. While its aim was to dismantle the Ottoman Empire, this was ultimately achieved through the Treaty of Lausanne in 1923, which led to the establishment of the Republic of Turkiye.

### **The Rise of England and the Fall of the Ottoman Empire**

This section analyzes the quantitative data available to examine the Thucydidean Trap between the Ottoman Empire and England. The core of this hypothesis is that the rise of England caused the fall of the established Ottoman Empire. The Thucydidean Trap suggests a clear causality running from the rising power to the established power, which we will eventually test in this section using statistical analyses. First, we will provide a descriptive analysis of the data, beginning with England's GDP per capita. I use the term "England" rather than "U.K.," which was established in 1801 with the inclusion of Ireland.

#### *England's GDP per Capita, 1252–1923*

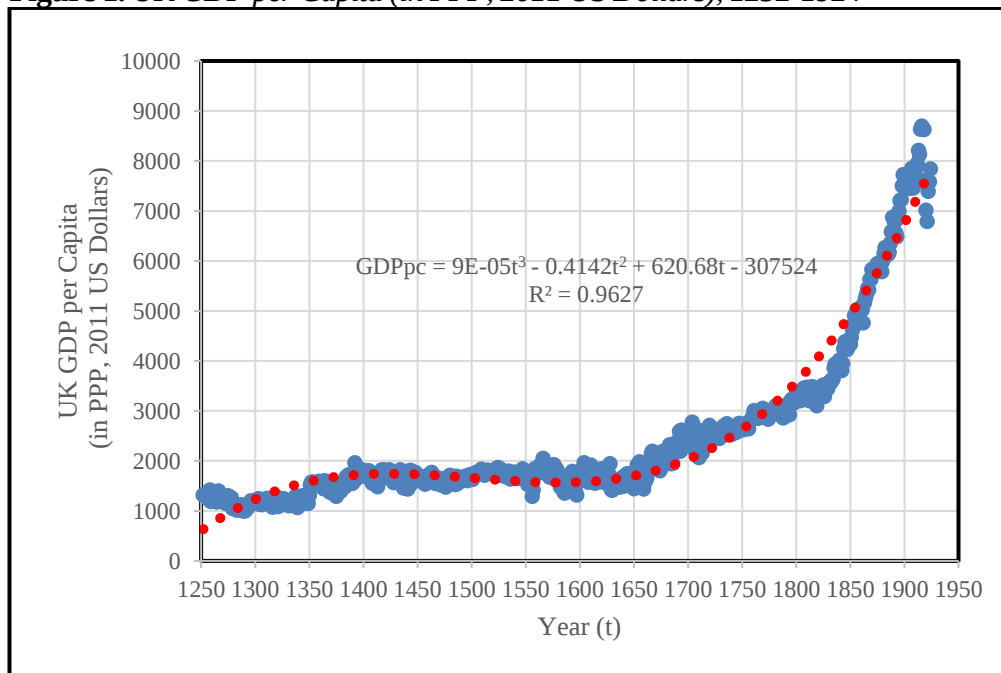
As mentioned above, data on England's GDP per capita have been available since 1252. Figure 1 presents a series spanning 672 years. Additionally, I include the best-fit trend, represented by a third-degree polynomial. While the chart largely speaks for itself, several observations are worth noting here.

First, the rise in England's GDP per capita began much earlier than the start of the First Industrial Revolution, around 1760. To use cliometric jargon, the First Industrial Revolution cannot be considered as Granger-causing the increase in England's GDP per capita. Rather, the opposite might be true: the prolonged, albeit small, increase in GDP per capita starting around 1650 may have Granger-caused the First Industrial Revolution.

Second, although the hypothesis of a positive association between the two industrial revolutions and the unprecedented rise in England's GDP per capita cannot be tested quantitatively, it should not be dismissed simply by observing Figure 1. In fact, England's GDP per capita is rising at an increasing rate, as seen from the fitted polynomial curve. If we had an index of industrialization, we could test the nature of the causality between industrial revolutions and economic development (GDP per capita). Again, using cliometric jargon, the Industrial Revolution will cause a permanent

change in the trend of the variable; that is, the variable would become stochastically stationary.

**Figure 1.** UK GDP per Capita (in PPP, 2011 US Dollars), 1252-1924

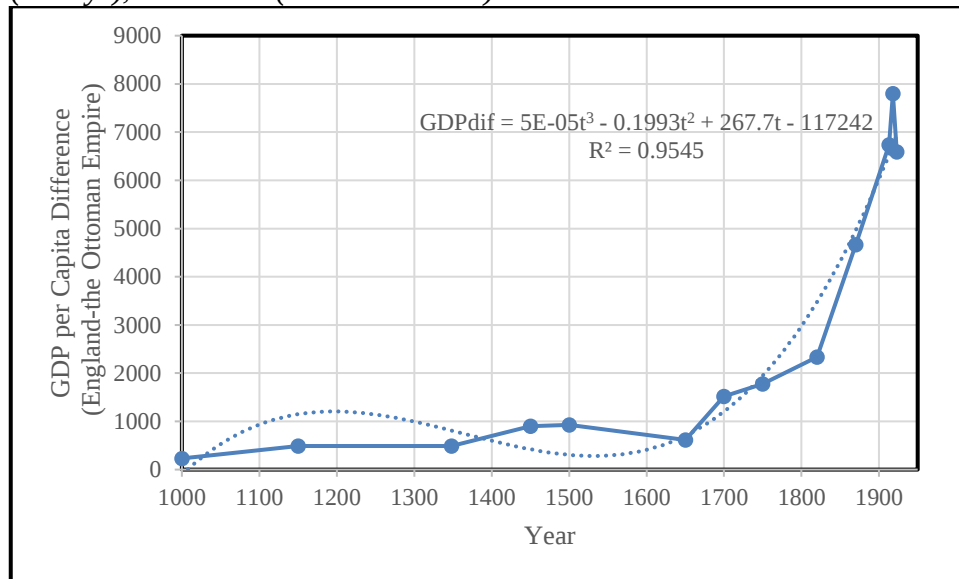


#### *The GDP per Capita Gap Between England and the Ottoman Empire*

There are 13 observations on GDP per capita in the dataset from 1000 to 1923 that refer to Türkiye. I assume that the levels and variations were similar for the Ottoman Empire. Figure 2 depicts the difference between these 13 GDP per capita observations for the Ottoman Empire and the corresponding observations for England's GDP per capita. Despite the increases in the Ottoman Empire's GDP per capita throughout its existence, the difference from what was happening in England after the mid-17th century is striking. Analyzing the trend line—a third-degree polynomial gave the best fit of the difference, similar to the one depicted in Figure 1—reveals three important phases, assuming the data series is reliable.

Before the establishment of the Ottoman Empire, from 1000 to 1200, the difference increased in favor of England. Around 1200, the difference began to decrease until the mid-16th century. During this long period, two important events occurred. First, in 1204, Constantinople was sacked by the Crusaders and occupied until 1261. As many have noted, this contributed to the weakening of the Byzantine Empire and led to its eventual capture by the Ottomans in 1453, which was the second major event of the period.

**Figure 2.** *GDP per Capita Difference Between England and the Ottoman Empire (Türkiye), 1000-1923 (13 Observations)*



After the mid-17th century, the gap between England and the Ottoman Empire skyrocketed. From \$614 in 1650—the lowest value ever during the rule of the Ottoman Empire—the difference began to rise, reaching \$1,515 in 1700, \$2,332 in 1820, \$4,664 in 1870, and its highest-ever value of \$7,798 in 1918, just five years before the collapse of the Ottoman Empire and its partial replacement by the Republic of Türkiye.

#### *Increasing the Degrees of Freedom of the Dataset*

One might wrongly conclude from the above descriptive analysis that the rise of England was the reason for the decline of the Ottoman Empire. This might not be true. It is quite possible that other variables, or as historians might say, many factors contributed to the rise of one and the decline of the other.<sup>6</sup> However, this paper's cliometric approach argues that all philological historical explanations and narratives are as valid as any other Herodotean explanations, since there is no evidence to test them. The hypothesis we want to test is that it was the rise of England that eventually led to the collapse of the Ottoman Empire. To do this in the cliometric way, we need a greater number of observations to acquire the necessary degrees of freedom for statistical analysis.

The small number of observations—only 13 in Figure 2—prevents any formal statistical (cliometric) analysis. We need more observations. A continuous time series for England's GDP per capita exists from the 13<sup>th</sup> century, as shown in Figure 1 above.

<sup>6</sup>These are the "philological" explanations of historical events. Sometimes, good novels are much better than disguised storytelling that appears as a historical scientific explanation. These "philological" explanations usually encompass the all-inclusive variable of "culture," where everything can be explained by cultural differences. Some difficulties arise for this "theory" when, like Thucydides, it tries to explain a war between two great powers that share the same culture, as this was defined by Herodotus as explained in Papanikos (2024).

Data for the Ottoman Empire do not exist. Instead, I use 30 observations that refer to the area of the Ottoman Empire in various years, from its inception in 1300 to its fall in 1923. Table 4 presents these 30 observations. I have also included England's GDP per capita for the same years in the last column. Since our purpose here is to account for the rise and fall of the two great powers—the Ottoman Empire and England—the area of the former and the GDP per capita of the latter can be used as good quantitative proxies for the relative strength of the two powers.

Figure 3 depicts the two variables from Table 4 together in a scatter diagram. This facilitates the comparison between the Ottoman Empire's indicator of strength and England's indicator. On the left vertical axis, we measure the area of the Ottoman Empire, and on the right, England's GDP per capita. What is compared are the various cycles, providing descriptive evidence for the hypothesis of a Thucydidean trap between the two great powers of the past. Along with the scatter diagram, the best-fit lines for both variables, as depicted in Figure 3, are also reported.

**Table 4.** *Area of the Ottoman Empire and England's GDP per Capita*

|    | Year | Ottoman Empire's Area<br>(millions of square km) | England's GDP per capita<br>(in PPP 2011 US\$) |
|----|------|--------------------------------------------------|------------------------------------------------|
|    | 1250 | 0                                                | 1320                                           |
| 1  | 1300 | 22                                               | 1159                                           |
| 2  | 1359 | 57                                               | 1592                                           |
| 3  | 1451 | 673                                              | 1685                                           |
| 4  | 1481 | 1340                                             | 1640                                           |
| 5  | 1520 | 3630                                             | 1755                                           |
| 6  | 1566 | 5253                                             | 2056                                           |
| 7  | 1639 | 5188                                             | 1640                                           |
| 8  | 1672 | 5176                                             | 1860                                           |
| 9  | 1683 | 6791                                             | 2323                                           |
| 10 | 1699 | 6332                                             | 2324                                           |
| 11 | 1718 | 6300                                             | 2606                                           |
| 12 | 1739 | 5818                                             | 2584                                           |
| 13 | 1774 | 5621                                             | 2834                                           |
| 14 | 1783 | 5560                                             | 3027                                           |
| 15 | 1792 | 5534                                             | 3134                                           |
| 16 | 1798 | 3816                                             | 3161                                           |
| 17 | 1801 | 5257                                             | 3351                                           |
| 18 | 1812 | 5208                                             | 3207                                           |
| 19 | 1817 | 5167                                             | 3253                                           |
| 20 | 1829 | 4944                                             | 3443                                           |
| 21 | 1830 | 4751                                             | 3550                                           |
| 22 | 1862 | 4751                                             | 4764                                           |
| 23 | 1878 | 4528                                             | 5879                                           |

|    |      |      |      |
|----|------|------|------|
| 24 | 1881 | 4362 | 6146 |
| 25 | 1882 | 2921 | 6269 |
| 26 | 1912 | 2234 | 7954 |
| 27 | 1913 | 1985 | 8212 |
| 28 | 1913 | 2006 | 8212 |
| 29 | 1920 | 302  | 7017 |
| 30 | 1923 | 815  | 7587 |
|    | 1924 | 0    | 7844 |

The most striking feature of Figure 3 is the co-evolution of four cycles, which are summarized in Table 5.

In **Phase A (1300–1550)**, the Ottoman Empire gradually rose to power, primarily clashing with the declining Byzantine Empire, which had been weakened by the Fourth Crusade of 1204 and the sacking of Constantinople. This period also includes significant conflicts, such as the Battle of Mohács (1526) against the Hungarians, which the Ottomans won, and the Siege of Vienna (1529), where the Ottomans failed to conquer the city and expand further into Europe. However, they successfully conquered Egypt in 1517.

**Phase B (1550–1650)** is characterized by the Ottoman Empire's expansion at an increasing rate. During this period, the Ottomans conquered Cyprus (1570–1571) and expanded into Persia, as exemplified by the Ottoman-Safavid Wars (1623–1639).

**Phase C (1650–1800)** is considered the period of the Ottoman Empire's consolidation. This phase includes some of its greatest achievements, such as the conquest of the Morea (Greece) in the 1680s.

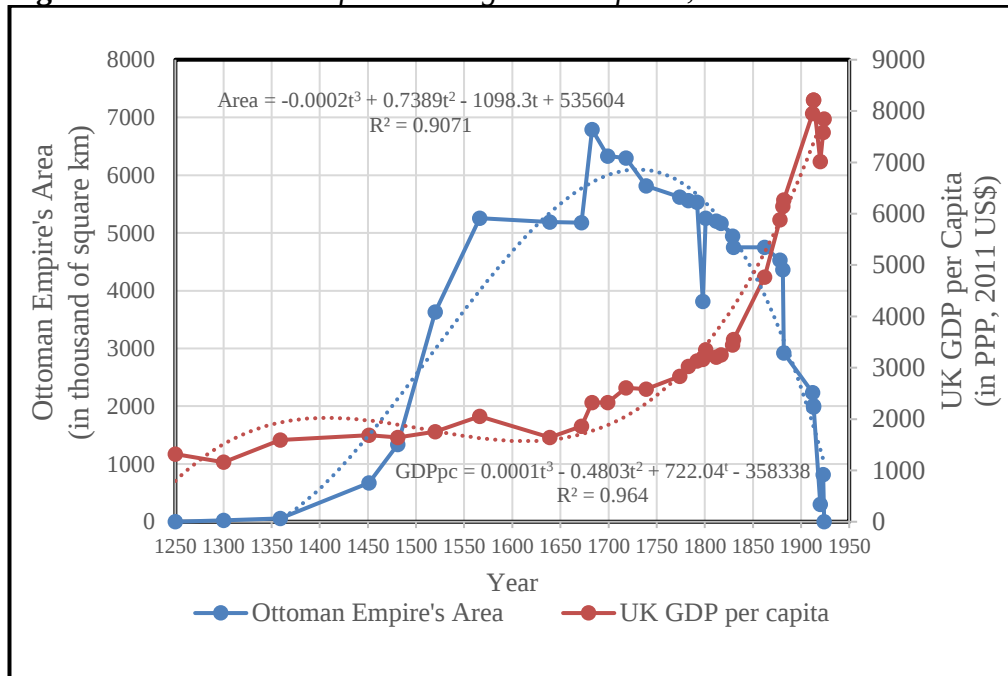
**Phase D (1800–1923)** marks the decline of the Ottoman Empire, with significant territorial losses beginning with Greek independence (1821–1828) and continuing throughout the 19<sup>th</sup> century and the first two decades of the 20<sup>th</sup> century. This is the most important period for our analysis because it marks the beginning of the fall of the Ottoman Empire, and we need to examine the role of the emerging powers during this time.

What was England's performance during these four phases? Phases A and B are characterized by relatively flat development. England began to rise at the end of Phase B and the beginning of Phase C. In 1583, Sultan Murad III and Queen Elizabeth I established official diplomatic relations, leading to the arrival of the first English ambassador in Constantinople. The mission was to negotiate trade agreements favoring English merchants. England's role remained minor until the 19<sup>th</sup> century, when it became directly involved in wars with the Ottoman Empire and played a pivotal role in its dismantling, culminating in the establishment of the Republic of Türkiye in 1923.

In the 1830s, England not only encouraged the Balkan states (Albanians, Bulgarians, Greeks, and Serbs) to rebel against the Ottoman Empire but was also actively involved in conflicts. For example, a decisive event was the naval battle of Navarino (20 October 1827), during which the allied naval forces of England, France, and Russia destroyed the Ottoman Empire's navy. This battle led to the creation of the Greek state under the patronage of England, as explained in Papanikos (2022d). During the 19<sup>th</sup>

century, the Ottoman Empire lost most of its territories in wars against the great powers of Europe: France, Italy, Russia, and, of course, England. Egypt became a British possession in 1882.

**Figure 3.** *The Ottoman Empire and England Compared, 1250-1923*



**Table 5.** *Phases of the Thucydides Trap Between England and the Ottoman Empire*

|                | <b>Phase A<br/>(1300-1550)</b> | <b>Phase B<br/>(1550-1650)</b> | <b>Phase C<br/>(1650-1800)</b> | <b>Phase D<br/>(1800-1923)</b> |
|----------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| Ottoman Empire | Rising at a Decreasing Rate    | Rising at an increasing Rate   | Established                    | Decline                        |
| England        | Static/Flat                    | Static/Flat                    | Rising at a Decreasing Rate    | Rising at an Increasing Rate   |

The final blow was World War I, during which the Ottoman Empire aligned with the losing side. By the war's end, the price it paid was its dismantling. A detailed analysis of all these significant events lies beyond the scope of this paper.

The analysis above does not conclusively prove anything. One could argue that this is circumstantial evidence and that no causal relationship existed between the fall of the Ottoman Empire and the rise of England. Addressing this question requires cliometric analysis, which is undertaken below.

#### *A Cliometric Analysis*

The following statistical analysis includes all 30 observations. However, the same results were obtained even when excluding the observation for the year 1920. These alternative results are not reported here. There is a problem with our time series.

This is not a typical time series where the time intervals—such as year, quarter, or month—are equally spaced. Instead, the time intervals between two observations of the same variable differ. This irregularity may affect the reliability and interpretation of the results.

Nevertheless, the theoretical foundation of what we are testing is the most important aspect. In our case, this is grounded in the theory of a rising power coming into conflict with an established power. Our goal is to test this theory using statistical analysis.

The first step in a reliable statistical analysis to determine whether two variables are meaningfully associated is to test their stationarity properties. In this case, the two variables are the Ottoman Empire's area and England's GDP per capita. Table 6 presents the results of the Augmented Dickey-Fuller Test for stationarity. The test indicates that the variables are not stationary at their levels but become stationary when differenced once.

**Table 6. Unit Root Tests (Augmented Dickey-Fuller Test)**

| Variables                | Level<br>t-values | Prob*  | 1 <sup>st</sup> Difference<br>t-values | Prob*  |
|--------------------------|-------------------|--------|----------------------------------------|--------|
| Ottoman Empire's Area    | -1.49             | 0.5217 | -4.43                                  | 0.0016 |
| England's GDP per capita | 0.04              | 0.9548 | -4.69                                  | 0.0008 |

\*MacKinnon one-sided p-values.

Both variables are integrated of order one, I(1). Variables integrated at the same order may be cointegrated, indicating a long-run relationship between them. There are two tests for checking cointegration: the Engle-Granger two-step method and the Johansen Cointegration Test. We applied both tests, and the hypothesis of no cointegration—implying no long-run relationship between the Ottoman Empire's area and England's GDP per capita—was rejected.

The Engle-Granger method is more appropriate in this case because we have only one independent variable. The procedure is straightforward: first, we run a regression of the Ottoman Empire's area on England's GDP per capita. Second, we perform an ADF unit root test on the residuals. If the hypothesis of a unit root is rejected, then the two variables are cointegrated.

Table 7 reports the results. With a p-value of 0.0209, we reject the null hypothesis of a unit root at the 5% significance level. This implies that the residual series is stationary and that the two variables are cointegrated, demonstrating a strong long-term relationship between the Ottoman Empire's area and England's GDP per capita.

However, the presence of cointegration does not necessarily imply causality. The theory predicts that causality runs from England's GDP per capita to the Ottoman Empire's area. To test for a causal relationship, we apply the Granger causality test, with the results presented in Table 8.

The Granger causality test fails to reject the hypothesis that England's GDP per capita does not Granger-cause the Ottoman Empire's area at the 1% significance level. Conversely, the test does not reject the hypothesis that the Ottoman Empire's area does not Granger-cause England's GDP per capita. Therefore, causality appears to run one way—from England's GDP per capita to the Ottoman Empire's area.

**Table 7. Testing for Cointegration Using Engle-Granger two-step method**

|                                                                |             |        |
|----------------------------------------------------------------|-------------|--------|
| Null Hypothesis: The Errors of the regression have a unit root | t-statistic | Prob.  |
| Augmented Dickey-Fuller test statistic                         | -2.343      | 0.0209 |
| Test critical value: 1%                                        | -2.647      |        |
| Test critical value: 5%                                        | -1.953      |        |
| Test critical value: 10%                                       | -1.61       |        |

Cliometrics not only tests the hypothesis that the emerging power challenges the established power but also quantifies this relationship to answer the following question: If the strength of an emerging power increases by 10%, what would be the percentage decline in the strength of the established power? This question can be addressed through regression analysis. However, a simple Ordinary Least Squares (OLS) regression would not yield reliable results because the two variables are cointegrated.

**Table 8. Granger Causality Test**

|                                                                       |             |             |
|-----------------------------------------------------------------------|-------------|-------------|
| Null Hypothesis                                                       | F-Statistic | Probability |
| England's GDP per capita does not Granger Cause Ottoman Empire's Area | 11.43       | 0.0023      |
| Ottoman Empire's Area does not Granger Cause England's GDP per capita | 0.0018      | 0.9663      |

Cointegration techniques are necessary to obtain unbiased coefficient estimates for the parameters of a linear model involving cointegrated variables. In this study, we applied the Dynamic Least Squares (DLS) method, which is more suitable for estimating parameters in models with cointegration and dynamic relationships. Table 9 presents the regression results obtained from both the OLS and DLS methods.

**Table 9. Regression Results (Dependent Variable: Ottoman Empire's Area)**

| Variables                | OLS             | DLS           |
|--------------------------|-----------------|---------------|
| Constant                 | 4977* (3.29)    | 5910* (6.43)  |
| England's GDP per capita | -0.29 (1.72)*** | -0.49** (2.1) |
| R <sup>2</sup>           | 0.0961          | 0.3315        |
| R <sup>2</sup> -Adjusted | 0.0638          | 0.2000        |
| F-Statistic              | 2.9976          |               |
| Prob (F-statistic)       | 0.0956          |               |
| DW                       | 0.218           |               |
| Observations             | 30              | 30            |

\* Significant at 1% level; \*\*Significant at 5%. \*\*\*Significant at 10%.

Note: In parentheses, absolute values of t-statistics.

As expected, the DLS method produces better results than the OLS method, with the DLS model demonstrating greater explanatory power. The predictors account for 20% of the variability in the Ottoman Empire's area. The coefficient for England's GDP per capita is negative, failing to reject the hypothesis that as England rises, the Ottoman Empire declines.

Evaluated at the average values of the two variables, the elasticity is calculated as  $-0.49 \cdot (3807/3878) = -0.4811$ . This implies that during this period, a 10% increase in England's GDP per capita corresponded to a 4.8% decrease in the area of the Ottoman Empire.

Summarizing the above cliometric analysis, Thucydides' theory cannot be rejected: an emerging power inevitably comes into conflict with an established power. This dynamic was evident in the case of England and the Ottoman Empire, where England emerged victorious. In contrast, during Thucydides' time, the established power of Sparta prevailed over the rising power of Athens.

## Conclusions

The rise and fall of great powers is a central theme in history. Herodotus, the "father of history," was the first to aim at explaining how great powers emerge and decline. He emphasized the personal characteristics of leaders, along with divine intervention and fate. Thucydides, however, had a different perspective. He believed that the rise and fall of great powers result from their relative antagonism, as an emerging power challenges an established one. The two great powers enter into a long-standing rivalry that can take many forms, with war being one possible outcome. These powers become trapped in a historical process that inevitably leads to conflict. This inevitable progression of events was called the Thucydides Trap.

In this paper, I test this theory using statistical techniques to analyze quantitative data from the 600-year rule of the Ottoman Empire and its antagonism with England. This type of analysis is known as cliometrics. The empirical evidence does not reject the hypothesis that the emerging power of England, following the First Industrial Revolution in the mid-18th century, contributed to the beginning of the Ottoman Empire's decline. This was due to a variety of factors, including both direct and indirect wars between the Ottoman Empire and England. By the end of the Second Industrial Revolution in 1914, England had become a superpower. During the First World War (1914-1918), the Ottoman Empire fought against England. The Ottoman Empire was on the losing side and was dismantled three years later, in 1920. It was finally replaced by the Republic of Türkiye in 1923.

One of the advantages of cliometrics is its ability to test historical causalities, such as whether the strength of England, measured by GDP per capita, caused the decline and eventual dismantling of the Ottoman Empire, as measured by the area of land it controlled. The Granger-causality test shows that this scenario cannot be rejected. Furthermore, statistical analysis allows the historical researcher to quantify this negative effect. In this study, it is found that a 10% increase in England's strength is associated with a 4.8% decrease in the power of the Ottoman Empire.

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