

# Determinants of Bilateral Trade between Europeans and the Ottoman Empire: 1878-1913

MERYEM TÜREL<sup>a</sup> KAZIM BAYCAR<sup>b</sup>

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*During the 19<sup>th</sup> century, the Ottoman Empire experienced an increased integration into the world economy, primarily through the development of bilateral trade with European markets. This study examines the determinants of bilateral trade of the Ottoman Empire with its trading partners between 1878 and 1913 using a panel regression framework. The results indicate that the GDP of trading partners, distance, common borders, and the adoption of the metric system significantly affected bilateral trade. In contrast, the GDP of the Ottoman Empire, trade agreements, railways, and commercial ports had no statistically significant effects on the mentioned trade relations.*

**JEL codes:** B10, N7, F14

**Keywords:** Ottoman Empire, Nineteenth century, Foreign trade, Gravity model of trade


## 1 Introduction

Ottoman historiography is rich in terms of academic literature written on Ottoman commercial relations and international trade with other countries. Interestingly enough, most of these studies were devoted to the pre-19<sup>th</sup> century, while studies on this century (when the boom in international trade took place) remained limited. In addition, the majority of the existing literature handles the issue from an institutional perspective. In this respect, the academic studies remained restricted to some specific topics, such as the content and characteristics of commercial conventions (capitulations) that are granted to the European countries (Kütükoğlu, 2013), custom regimes (Sahillioğlu, 1968), the role of the dragomans, commercial envoys or traductors (Bağış, 1983), or the functions of the Port cities (Keyder et al., 1993) in international trade.

Apart from the issue of the time, there is another considerable drawback in Ottoman economic historiography related to the content of the studies. As a matter of fact, how bilateral trade between the Ottoman Empire (hereafter OE) and its European counterparts has been elaborated on in the literature, whereas the determinants of the scale of the trade

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<sup>a</sup> Corresponding Author. Kocaeli University, Dept. of Economics, Kocaeli, Türkiye.  
email: meryem.turel@kocaeli.edu.tr  <https://orcid.org/0000-0002-6921-3421>

<sup>b</sup> Yıldız Technical University, Dept. of Economics, İstanbul, Türkiye. email: kazimbaycar@gmail.com  
 <https://orcid.org/0000-0002-6420-7559>

have been neglected. Obviously, the role of the OE in global trade, as one of the important (even though weak) economic and political actors of the time, deserves to be investigated from an economic perspective. The OE not only served as a marketplace for European industrial products but also played a crucial role in providing natural sources for the industrialization attempts of the European nations. Furthermore, by the intensification of the trade relationship with its European counterparts, Ottomans aimed to achieve economic modernization. In this respect, understanding the autonomy of the Ottoman trade relations with the Europeans relying on numbers would be illuminating not only for Ottoman but also for European economic history.

The reluctance of the Ottoman historians to focus on this issue may stem from the lack of technical capability, such as econometric analysis and data wearing, and limitations of collecting data for constructing time series that are essentially required. Today, not only in the realm of economics but also in the field of economic history, econometric modeling has improved, allowing us to raise questions that had not been asked before and analyze them with contemporary techniques. In addition, thanks to digitalization technology, we are now able to collect data from various historical documents, most of which are available online. All such developments make us confident to question the true determinant of the Ottoman trade with Europeans in the 19<sup>th</sup> century.

The integration of the OE into the world economy took place throughout the 19<sup>th</sup> century. The OE engaged in the European market through the development of bilateral trade. Historically, the increase in trade volume has been attributed to the intensification and liberalization of world trade and the reduced cost of transportation. The economic involvement of the Europeans took place via a series of trade agreements signed between the Sublime Port and its European partners. Especially the one signed with the UK, namely the 1838 “Balta Liman Convention”, constitutes a milestone in this process. Between 1838 and 1841, the OE signed similar agreements with France, Germany, Sweden, Norway, the Netherlands, Belgium, and Denmark (Kasaba, 1993, p. 50). After the 1830s, Ottoman trade with European countries kept increasing. The volume of exports rose 3.3 times while imports increased 4.6 times from 1840 to 1912. Meanwhile, the OE’s trade regime became one of the most liberal ones among the world countries of the time (Geyikdağı, 2011, p. 25).

In fact, world trade experienced a boom in the second half of the 19<sup>th</sup> century. Due to the intensification of international trade, flows of capital, and labour, the period between 1870 and 1913 is named as First Globalization Age by economic historians. Traditionally, the increase in trade is associated with diminishing transportation costs and liberal commercial policies, and/or the common currency effect (Estevadeordal et al., 2003).

In global literature, several studies examine historical bilateral trade flows (e.g., Eichengreen & Irwin, 1996; Estevadeordal et al., 2003). However, empirical research on the OE’s bilateral trade remained very limited. Hanedar (2016) estimated the effect of wars and boycotts on bilateral trade using a gravity panel regression model between 1830-1913. His findings show a significant decrease in trade volume because of wars and boycotts during this period. Using a gravity model, Çetin (2019) showed that the Ottoman trade increases with the economic size and decreases with the distance of the trading partner country. Similarly, Li et al. (2019) scrutinized the market integration between the OE and its European counterparts between 1469-1914 by testing for co-integration via Bayesian inference. In their analysis, they conclude that the rising conflict between the European states and the OE had negative effects on market integration during the second half of the 19<sup>th</sup> century.

The abovementioned studies shed light on the development of Ottoman international trade by focusing on different aspects. Still, a comprehensive analysis of the true determinant of Ottoman international trade in the First Globalization Age has not been achieved. In order to fulfil this gap in the literature, we aim to examine possible determinants of bilateral trade of the OE with its trading partners during the 1878-1913 period using the Poisson Pseudo Maximum Likelihood Estimator for the gravity equation. In this respect, our paper contributes to the literature in several ways; (i) we extend the scarce empirical literature on Ottomans bilateral trade by using a Poisson Pseudo Maximum Likelihood Estimator, (ii) apart from previous studies, we include two different dummy variables, namely the adoption of the metric system and the existence of a commercial port in the respective trading partner, (iii) we employ various specifications to see the impact of variables on trade flows in a comparative sense.

The structure of this article is organized as follows. Section 2 provides background information about the OE’s bilateral trade. Section 3 indicates the data set and describes the gravity model which we used in this study. Section 4 analyses the empirical results, and Section 5 concludes.

## 2 Historical Background on the Ottoman Empire’s Bilateral Trade

One of the pillars of the OE’s classical economic mentality was “provisionism”, which refers to providing adequate subsistence that had to be guaranteed in İstanbul and other big cities to ensure stability and avoid conflict in cities. According to this mentality, the OE was traditionally inclined to encourage imports while it was more likely to restrict exports. The provisionism remained to be the prevailing paradigm in the Ottoman economic

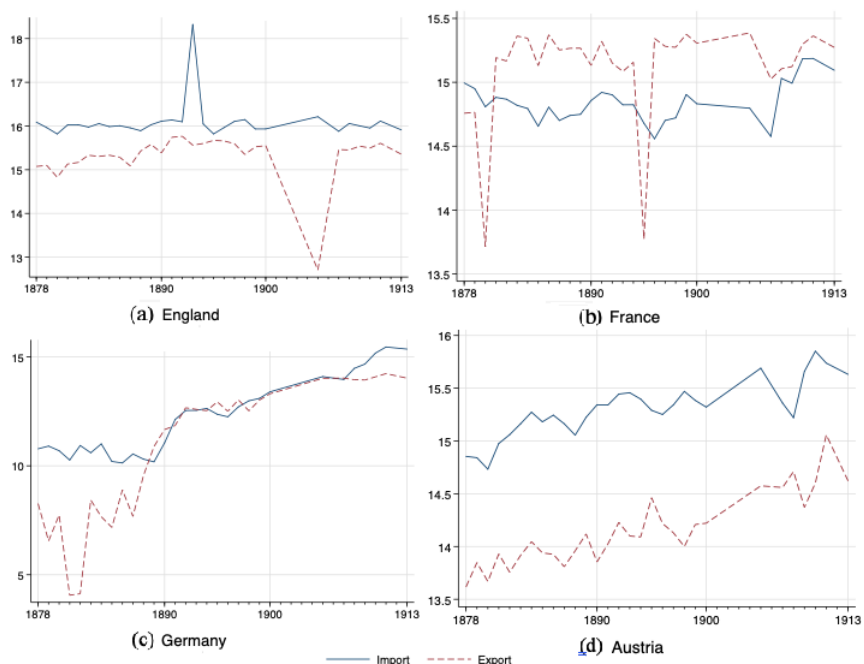
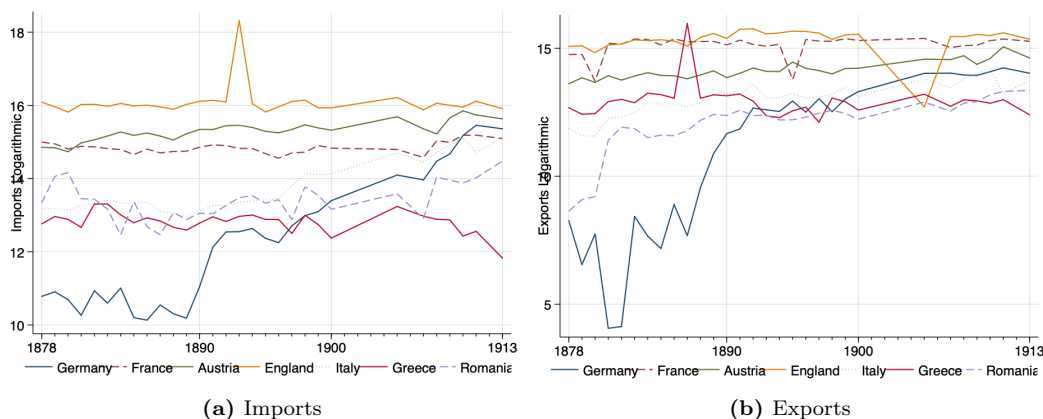


Figure 1: Trade with main trading partners, in the Golden Lira  
Source: Pamuk (1995)

understanding for several centuries. However, starting by the beginning of the 19<sup>th</sup> century, things began to change everywhere in the world. In the age of modernization, Ottoman production and trade began to expand with the cotton, grapes, tobacco, corn, and livestock trade (Kasaba, 1993). The main customers of the expanding Ottoman agricultural goods were initially France and Austria. After the 1830s, these countries were replaced by England because of political reasons and economic concessions given to this country. Between 1830 and 1870, the share of Ottoman exports to England increased from 13.3% to 27.2%, while the share of imports from England increased from 19% to 32.4% (Kasaba, 1993). Although trade with England came to the fore, other European countries were not neglected. On the contrary, the OE's trade relations with France, Austria, the USA, and Russia also improved during the 19<sup>th</sup> century.

According to Figure 1, which depicts the foreign trade statistics of the OE from 1878 to 1913 with main trading partners, shows that trade with England and France was relatively stable, albeit there were some peak and trough points in specific years. As for Germany, an increasing trend can be witnessed both in exports and imports. Still, exports increased very much in comparison. Panel (d) shows a steady increase in trade with Austria both in export and import, although imports were higher than exports. Figure 1 suggests that the main trade relation with European markets of the OE was through imports. Because, in all figures, import numbers are much higher than export numbers.



**Figure 2:** Imports and Exports of the Ottoman Empire, in the Golden Lira  
Source: Pamuk (1995)

According to Figure 2a, imports of the OE were relatively stable during the period with the main partners except for Germany. As indicated in Figure 2b, like the import figures, the OE exports were very stable during the period with the main partners except for Germany and Italy. Stable trade relations can be explained by the selected study period, considering that 1878 to 1913 corresponded to the after crises period in Europe.

### 3 Data and Methodology

The sample dataset is an unbalanced panel of 14 countries: Germany, Austria, France, England, United States, Belgium, Denmark, Netherlands, Spain, Sweden, Italy, Greece, Romania, and Russia, covering the period of 1878–1913. Data on Ottoman export and

import with trading countries are obtained from Pamuk (1995). However, there are several missing observations in the trade data for both years and partners. The 1901-1905 period is missing for all trading partners. All import and export values are expressed in Ottoman Gold Lira. GDP data of the OE are compiled from different sources like Eldem (1994) and Pamuk (2006). These sources, however, provide data for particular years, like 1870 or 1913, which is not in the time series form. For this reason, missing values are interpolated by using the average annual growth rate of GDP retrieved from Pamuk (2006) for missing years. GDP data for the OE expressed in 1990 U.S. dollars. GDP data for trading partners of the OE are extracted from Maddison (2003) and Broadberry & Klein (2012). All values of GDP variables are expressed in 1990 U.S. dollars. The cost of trade is proxied with two variables, which are widely used variables for trading costs in any gravity model framework: common borders and the distance of capital cities. Trade agreements data are taken from Kasaba (1993). The first trade agreement was signed between the OE and the U.K. in 1838. In the next few years, the OE signed free-trade agreements with France, Germany, the U.S., Sweden, Norway, Netherlands, Belgium, and Denmark (Kasaba, 1993, p. 50). Information about railway is provided by Güran (2017). A few countries, such as England, France, and Austria, constructed and operated railways in the Ottoman lands during the period. We also included the adoption of the metric system into our model as a dummy variable since it is accepted that the wide adoption of the metric system is associated with attempts to increase international trade (Baycar, 2022). Data for the metric system are taken from François (2003). Lastly, we included whether the trading partner had a commercial port between 1878 and 1913 as a dummy variable in our model.

Our methodology is based on the panel gravity model framework. The gravity model of trade has been widely used in literature to explain bilateral trade flows since back Tinbergen (1962). It mainly explains the trade flows from country  $i$  to country  $j$  with the size of economies and proximity of countries. One important contribution to the traditional gravity equation is made by Anderson & van Wincoop (2003). They argued that the gravity equation is not correctly specified due to the fact that it does not take into account the multilateral resistance terms, which are basically defined as the trade barriers that each country faces with all its trading partners. They suggested that including fixed effects in the model can solve this problem. Although the traditional estimation technique of the gravity model is based on the ordinary least squares (OLS) with a log linearized model, it creates some challenges in order to estimate the model. First, due to the multiplicative form of the gravity equation, linear estimators may produce heteroscedastic residuals which, in turn, lead to inconsistent estimates of the equation. Second, the trade data generally include zero trade observations. Since the natural log of zero is not defined, this poses another problem for the log-linearized OLS model. To handle these problems, we utilized Poisson Pseudo Maximum Likelihood Estimator (PPML), which is a non-linear estimator, as proposed by Santos Silva & Tenreyro (2006). Our gravity regression of the OE trade is as follows.

$$TR_{ijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln DI_{ijt} + \beta_4 BDR_{ijt} \\ + \beta_5 AGR_{ijt} + \beta_6 RAIL_{ijt} + \beta_7 PORT_{jt} + \beta_8 MET_{ijt} + \epsilon_{ijt}$$

where  $i$ ,  $j$ , and  $t$  are indices for the OE, its trading partner, and year, respectively;  $TR_{ijt}$  is the trade between the OE and the trading partner  $j$  in year  $t$ , expressed in Golden Lira, and calculated as exports plus imports.  $\ln GDP_{it}$  is the natural logarithm of the OE's GDP,

$\ln GDP_{jt}$  stands for the trading partner’s GDP,  $\ln DI_{ijt}$  refers to the distance between two countries in kilometers,  $BDR_{ijt}$  indicates common border and takes the value of 1 if the OE and its trading partner share a common border,  $AGR_{ijt}$  is a dummy variable that takes the values of 1 if the OE signed a trade agreement with the partner country,  $RAIL_{ijt}$  is a dummy variable that stands for whether there were railroad lines in the OE that were operated by firms of a trading partner,  $PORT_{jt}$  is a dummy variable that takes the value of 1 if the partner country had a commercial port between 1878-1913, and, lastly,  $MET_{ijt}$  indicates if the trading country used the metric system in the respective period. We also included country and time dummies in our model to account for country-specific and time-specific effects. Table 1 reports the descriptive statistics of variables.

**Table 1:** Descriptive statistics

| label  | Variable         | Source                                     | # of Obs. | Mean | Std. Dev. | Min. | Max.  |
|--------|------------------|--|-----------|------|-----------|------|-------|
| imp    | Import of the OE | Pamuk (1995)                               | 392       | 1.93 | 5.14      | 0.00 | 90.55 |
| exp    | Export of the OE | Pamuk (1995)                               | 380       | 1.05 | 1.65      | 0.00 | 8.59  |
| gdp_fr | GDP of Partners  | Maddison (2003); Broadberry & Klein (2012) | 504       | 0.07 | 0.09      | 0.00 | 0.50  |
| gdp_oe | GDP of the OE    | Maddison (2003); Mitchell (1998)           | 504       | 0.01 | 0.00      | 0.01 | 0.02  |
| dist   | Distance         | Distance of capital cities                 | 504       | 2.28 | 1.81      | 0.63 | 8.40  |
| rail   | Railway          | Güran (2017); Kasaba (1993)                | 504       | 0.29 | 0.45      | 0.00 | 1.00  |
| agr    | Trade Agreements | Kasaba (1993)                              | 504       | 0.71 | 0.45      | 0.00 | 1.00  |
| bdr    | Common Border    | Bartholomew (1890); Dow (1920)             | 504       | 0.21 | 0.41      | 0.00 | 1.00  |
| port   | Commercial Port  | Bartholomew (1890); Dow (1920)             | 504       | 0.64 | 0.48      | 0.00 | 1.00  |
| metric | Metric System    | François (2003)                            | 504       | 0.64 | 0.48      | 0.00 | 1.00  |

*Note:* The figures of  $imp$ ,  $exp$ ,  $gdp_{fr}$ , and  $gdp_{oe}$  are in million Golden Lira, and  $dist$  is in thousand kilometers.

## 4 Empirical Results

This section estimates the gravity regression with Poisson Pseudo Maximum Likelihood Estimator. First, we estimated the model when the dependent variable is “trade” (sum of imports and exports) along with different specifications to see the results comparatively. Some specifications are estimated with country-fixed effects, while others are estimated with both country- and year-fixed effects. Since the GDP of the OE is a variable that only varies across time, it dropped in the specifications with year-fixed effects because of perfect collinearity. Table 2 shows the results for PPML, regression (1) is our baseline model, which includes all variables. When the year-fixed effects are not included as in regression (1), the GDP of partners, the metric system and the border are significant variables to explain the trade flows between European countries and the OE. However, when year-fixed effects are included, as in regression (2), all variables significantly explain the trade flows. Besides, all variables have a positive impact on trade relations except for distance. The negative coefficient on distance shows that the distance between the OE and its respective trading partner is negatively related to trade flows. Also, port and distance have the highest effects on the mentioned trade relations. It should be noted that the effects and significance of explanatory variables on trade flows are changing across different specifications. Although regression (2) displays that all variables are significant, we will focus on the majority of specifications to reach a conclusion. In this regard, the GDP of trading partners, border, and distance are significant variables to explain the sum of trade flows of the OE. In ad-

dition, the adaptation of the metric system is significant in all specifications in which it is included. These results are consistent with our prior expectations and limited previous research. Nevertheless, it should be considered that to the best of our knowledge; it is the first study to include the adaptation of the metric system and having a commercial port as explanatory variables in the gravity model to examine the OE’s trade flows. Therefore, the significance of the metric system in explaining trade relations stands out as an important result of this study.

**Table 2:** PPML estimates of Baseline Model

|              | Dependent Variable: <i>Trade</i> |           |           |           |           |          |
|--------------|----------------------------------|-----------|-----------|-----------|-----------|----------|
|              | 1                                | 2         | 3         | 4         | 5         | 6        |
| lngdp_fr     | 1.710*                           | 2.513**   | 1.710*    | 1.710*    | 2.513**   | 2.513**  |
|              | (0.895)                          | (0.981)   | (0.895)   | (0.895)   | (0.981)   | (0.981)  |
| lngdp_oe     | -1.270                           |           | -1.269    | -1.269    |           |          |
|              | (0.968)                          |           | (0.968)   | (0.968)   |           |          |
| lndist       | -2.739                           | -4.533**  | -1.155*** | -0.796    | -1.522*** | -2.852   |
|              | (1.739)                          | (1.895)   | (0.400)   | (2.369)   | (0.450)   | (2.584)  |
| bdr          | 3.408**                          | 4.085***  | 0.497***  | 1.060     | 0.433***  | 5.085*** |
|              | (1.343)                          | (1.493)   | (0.074)   | (3.155)   | (0.077)   | (1.046)  |
| rail         | 2.167                            | 3.314**   |           | 0.567     |           | 4.636*** |
|              | (1.499)                          | (1.640)   |           | (3.103)   |           | (1.098)  |
| agr          | 2.084                            | 3.656**   |           | -5.289*** |           | 0.306    |
|              | (1.649)                          | (1.798)   |           | (1.205)   |           | (3.139)  |
| port         | 5.388                            | 8.364**   |           |           |           | 6.733    |
|              | (3.500)                          | (3.825)   |           |           |           | (4.460)  |
| metric       | 0.725***                         | 0.303***  |           |           |           |          |
|              | (0.142)                          | (0.111)   |           |           |           |          |
| Constant     | 21.416**                         | 11.357*** | 14.574*** | 16.615    | -3.835    | 1.144    |
|              | (8.396)                          | (0.667)   | (2.956)   | (20.382)  | (7.914)   | (3.772)  |
| Observations | 367                              | 367       | 367       | 367       | 367       | 367      |
| R-squared    | 0.505                            | 0.798     | 0.505     | 0.505     | 0.798     | 0.798    |
| Country FE   | Yes                              | Yes       | Yes       | Yes       | Yes       | Yes      |
| Year FE      | No                               | Yes       | No        | No        | Yes       | Yes      |

*Note:* Standard errors are in parentheses. \*\*\*, \*\*, and \* denotes 1%, 5%, 10% significance level, respectively.

To see the effects of explanatory variables on different trade flows, we repeated the estimation with export and import as dependent variables. Table 3 provides the regression results. The first three regressions display the results for the import as the dependent variable, while the last three regressions display the results when the dependent variable is the export. Since we include the year-fixed effect, the GDP of the OE is dropped because of its perfect collinearity with year-fixed effects. Apart from this, the results are similar to our previous findings. According to Table 3, the GDP of trading partners’ distance, border, and the adoption of the metric system are significant in explaining the export and import flows of the OE, indicating that our results are robust with respect to alternative trade flows. On the other hand, railway and trade agreements and commercial ports are statistically insignificant in explaining the imports and exports of the OE. It is clear that railways lowers transportation costs and potentially improve trade relations among connected units. However, in the Ottoman case, the construction of railways was not mainly arisen from economic motives. It is because railways in the OE were constructed by European countries for the purpose of transporting the precious metals which are extracted with the metal



**Table 3:** PPML estimates of Gravity Model with exports and imports

|              | Dependent Variable: <i>Export</i> |                     |                       | Dependent Variable: <i>Import</i> |                     |                      |
|--------------|-----------------------------------|---------------------|-----------------------|-----------------------------------|---------------------|----------------------|
|              | 1                                 | 2                   | 3                     | 4                                 | 5                   | 6                    |
| lngdp_fr     | 2.864***<br>(0.677)               | 2.864***<br>(0.677) | 2.864***<br>(0.677)   | 2.416*<br>(1.245)                 | 2.416*<br>(1.245)   | 2.416*<br>(1.244)    |
| lndist       | -1.322***<br>(0.316)              | -4.033**<br>(1.810) | -1.018<br>(0.620)     | -1.791***<br>(0.569)              | -1.797<br>(3.272)   | -3.868*<br>(2.305)   |
| bdr          | 10.448***<br>(2.368)              | 5.965***<br>(0.707) | 6.411***<br>(1.291)   | 0.648***<br>(0.096)               | 4.968***<br>(1.328) | 1.592***<br>(0.157)  |
| rail         |                                   | -4.273*<br>(2.355)  |                       |                                   | -0.008<br>(4.26)    |                      |
| agr          |                                   | 2.529<br>(2.204)    |                       |                                   | -1.981<br>(3.975)   |                      |
| port         |                                   |                     | 2.455<br>(0.435)      |                                   |                     | 4.193<br>(2.664)     |
| metric       |                                   |                     | 2.934***<br>(0.159)   |                                   |                     | 0.902***<br>(0.091)  |
| Constant     | -10.670**<br>(5.435)              | 11.295*<br>(5.867)  | -15.869***<br>(3.279) | -1.011<br>(10.064)                | 1.018<br>(10.388)   | 13.559***<br>(2.968) |
| Observations | 380                               | 380                 | 380                   | 380                               | 380                 | 380                  |
| R-squared    | 0.870                             | 0.870               | 0.870                 | 0.794                             | 0.794               | 0.794                |
| Country FE   | Yes                               | Yes                 | Yes                   | Yes                               | Yes                 | Yes                  |
| Year FE      | Yes                               | Yes                 | Yes                   | Yes                               | Yes                 | Yes                  |

*Note:* Standard errors are in parentheses. \*\*\*, \*\*, and \* denotes 1%, 5%, 10% significance level, respectively.

privileges granted by the Ottoman state. Similarly, trade was not the primary motive for the OE. Instead, the OE was focusing on the role of railways in facilitating access to distant provinces of the Empire in order to preserve the social order (Engin et al., 2012). Regarding trade agreements, normally, we expect to improve trade relations after free trade agreements, but our finding may be explained by the nature of the trade agreements signed between European countries and the OE in the 19<sup>th</sup> century. After signing the Balta Liman trade agreement with England, the Ottoman State signed consecutive trade agreements with various countries. However, the majority of these agreements seem to be perfunctory, except for those signed with England and France. In this context, the ineffective nature of the trade agreements may have disturbed the explanatory role of trade agreements in bilateral trade flows. Also, our findings regarding railways and trade agreements are consistent with the previous literature, such as Hanedar (2016).

## 5 Conclusion

The integration of the OE into the world economy took place throughout the 19<sup>th</sup> century, especially through the development of bilateral trade with European markets. Although the existing literature handles the issue from an institutional perspective, the economic aspects of the subject have not been adequately researched yet. This study tries to fill this gap by extending the literature with an empirical perspective. Using a gravity equation framework, we examined the determinants of the bilateral trade of the OE with its trading partners during the 1878-1913 period. Apart from previous studies, we estimated the gravity equation with Poisson Pseudo Maximum Likelihood Estimator.



According to our results, when the dependent variable is the trade, distance and the GDP of trading partners, the adoption of the metric system and sharing a common border have statistically significant effects on the trade relations of the OE with its European trade partners. In contrast, the GDP of the OE, railways, trade agreements, and having a commercial port have no statistically significant effects on the mentioned trade relations. To be more specific in terms of import and export flows, we repeated the model so that the dependent variable is import and export. The results are very similar to previous findings. Distance, the GDP of trading partners, the adoption of the metric system, and sharing a common border are again significant for explaining import and export flows. This indicates that our results are robust with respect to alternative trade flows.

In this research, while we were analysing the research question, we faced limitations that restricted us from moving further. The main difficulty concentrates on the availability and reliability of the resources and the scarcity of historical literature on Ottoman bilateral trade. The data we used here are extracted from secondary sources and almanacs. Since world politics was so unstable at that time, the borders of the countries used to change constantly, making our job quite tough. It is a common problem who study the economies of the empires of the time, such as Britain, Habsburg, and Russia. To overcome the mentioned problem, we inspired the methodology that is used for the Imperial economies in the literature while collecting data. Hereby we opt to take into consideration the mainland imperial geographies of the country while neglecting the hinterlands. The reliability of the sources appeared as the second problem. Different currencies and units of scale were used in various datasets, which made the construction of the time series difficult. In addition, the data we extracted from various historical sources sometimes were not overlapping and even were contradictory. Again, relying on the examples of the literature on the other cases, we have chosen the one which seems to be more reliable and omitted the outliers.

With its interesting results, this study sparks some other research questions which may lead to further studies on this topic. First, a comparison between the Turkish case with the other non-European economies might be a good idea to comprehend the world economic order of the time within the framework of international trade. Apparently, the architect of the bilateral trade between European countries and late industrialized (and/or unindustrialized) nations of the time, such as Brazil, Iran, Argentina, Russia, and Portugal, appear to be interesting cases for comparison. Second, extending the time period might have allowed us to see whether the structural frame of international trade of the OE lasted during the Republican period. As a matter of fact, the capitulation rights, which had a big role in shaping the Ottoman bilateral trade, were completely abolished after the proclamation of the Republic. It would be noteworthy to scrutinize how bilateral trade in Turkey performed in the non-existence of these commercial privileges.

## References

- Anderson, J., & van Wincoop, E. (2003). Gravity with Gravitas: A Solution to the Border Puzzle. *American Economic Review*, 93(1), 170–192. doi:10.1257/000282803321455214
- Bağış, A. (1983). *Osmanlı Ticaretinde Gayrı Müslimler Kapitülasyonlar, Berath Tüccarlar Avrupa ve Hayriye Tüccarları, (1750-1839)*. Turhan Kitapevi, Ankara.
- Bartholomew, J. (1890). *Library Reference Atlas of the World*. MacMillan, New York.
- Baycar, K. (2022). Ottoman Integration into the European Metric System and the Standardization of Scales, 1860–1930. *Archiv orientální*, 89(3), 589-613. doi:10.47979/aror.j.89.3.589-613
- Broadberry, S., & Klein, A. (2012). Aggregate and Per capita GDP in Europe, 1870–2000: Continental, Regional and National Data with Changing Boundaries. *Scandinavian Economic History Review*, 60(1), 79-107. doi:10.1080/03585522.2012.651306
- Çetin, M. (2019). Osmanlı Devleti'nin Dış Ticaretinin Çekim Modeli Yaklaşımı ile Analizi. *Journal of Turkish Studies*, 14(4), 2163-2177. doi:10.29228/TurkishStudies.23459
- Dow, E. (1920). *Atlas of European History*. Henry Holt and Company, New York.
- Eichengreen, B., & Irwin, D. A. (1996). *The Role of History in Bilateral Trade Flows* (Working Paper No. 5565). NBER.
- Eldem, V. (1994). *Osmanlı İmparatorluğunun İktisadi Şartları Hakkında Bir Tetkik*. Türk Tarih Kurumu Yayınları, Ankara.
- Engin, V., Uçar, A., & Doğan, O. (2012). *Osmanlı'da Ulaşım: Kara, Deniz, Demiryolu*. Çamlıca Basım Yayın, İstanbul.
- Estevadeordal, A., Frantz, B., & Taylor, A. M. (2003). The Rise and Fall of World Trade, 1870–1939. *The Quarterly Journal of Economics*, 118(2), 359–407. doi:10.1162/003355303321675419
- François, C. (2003). *Encyclopaedia of Scientific Units, Weights, and Measures: Their SI Equivalences and Origins*. Springer, London.
- Geyikdağı, V. N. (2011). *Foreign Investment in the Ottoman Empire: International Trade and Relations, 1854–1914*. Tauris Academic Studies, London.
- Güran, T. (2017). *Resmi İstatistiklere Göre Osmanlı Toplum ve Ekonomisi*. İş Bankası Yayınları, İstanbul.
- Hanedar, A. Ö. (2016). Effects of Wars and Boycotts on International Trade: Evidence from the Late Ottoman Empire. *The International Trade Journal*, 30(1), 59–79. doi:10.1080/08853908.2015.1102107
- Kasaba, R. (1993). *Osmanlı İmparatorluğu ve Dünya Ekonomisi Ondokuzuncu Yüzyıl*. Belge Yayınları, İstanbul.
- Keyder, Ç., Özveren, E., & Quataert, D. (Eds.). (1993). *Port-Cities of the Eastern Mediterranean, 1800-1914*. Fernand Braudel Center, Binghamton University.

- Kütükoğlu, M. (2013). *Baltalimanına Giden Yol, Osmanlı İngiliz İktisadi Münasebetleri, 1580-1850*. Türk Tarih Kurumu Yayınları, Ankara.
- Li, Z., Panza, L., & Song, Y. (2019). The Evolution of Ottoman-European Market Linkages, 1469-1914. *Explorations in Economic History*, 71, 112-134. doi:10.1016/j.eeh.2018.10.002
- Maddison, A. (2003). *The World Economy: Historical Statistics*. OECD Development Centre, Paris.
- Mitchell, B. R. (1998). *International Historical Statistics: Europe, 1750-1993*. Palgrave Macmillan, London. doi:10.1007/978-1-349-14735-9
- Pamuk, Ş. (1995). *Ottoman Foreign Trade in the 19<sup>th</sup> Century*. State Institute of Statistics, Ankara. (Historical Statistics Series, No. 1)
- Pamuk, Ş. (2006). Estimating Economic Growth in the Middle East Since 1820. *The Journal of Economic History*, 66(3), 809-928. doi:10.1017/S0022050706000337
- Sahillioğlu, H. (1968). 1763'te İzmir Limanı İhracat Gümrüğü ve Tarifesi. *Belgelerle Türk Tarihi Dergisi*, 8, 53-57.
- Santos Silva, J. M. C., & Tenreyro, S. (2006). The Log of Gravity. *The Review of Economics and Statistics*, 88(4), 641-658. doi:10.1162/rest.88.4.641
- Tinbergen, J. (1962). *Shaping the World Economy: Suggestions for an International Economic Policy*. The Twentieth Century Funds.