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Identifying the Default: The Ottoman Empire and the İstanbul Bourse in the nineteenth century

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Identifying the Default: The Ottoman Empire and the İstanbul Bourse in the nineteenth century

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Abstract

This paper tests how default of a government is reflected in a bond market prior to its declaration to the public. There was an unsettled discussion on that the Ottoman moratorium was not surprise. The price of the General debt bond traded at the İstanbul bourse of the Ottoman Empire between 1874 and 1883 is manually collected. To identify the default risk of the Ottoman state, the paper analyses volatility jumps in return of the bond, using the ICSS and SWARCH methodology. Our results indicate higher volatility with decreasing price before the official declaration of the moratorium. This corresponds to increasing intensity of the rebellions in the Ottoman Empire, implying higher budget deficits and risks on the redemption of debts. The findings suggest the presence of a leading event for the default, as it can be seen that by the default announcement in October 1875 the bond price displays a significant and continuous decrease. This supports the lack of the dissemination of news on the moratorium prior to the declaration.

Keywords The moratorium of the Ottoman state; the İstanbul bourse; Structural breaks; the ICSS test; SWARCH

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1. Introduction

For different countries, researchers have discussed the effect of moratorium on bond markets, based on data for bond market outcomes and borrowing conditions. However the historical literature on the Ottoman default is limited and unsettled on when investors capitalized. The literature provides some evidence for the negative result of the moratorium for different countries. Tuncer (2011) finds statistically significant change in yield spreads for government bonds of the Ottoman Empire and Greece traded at the London Stock Exchange with the declaration of their defaults between 1870 and 1914. Similarly, Mitchener and Weidenmier (2010) and Mauro et al. (2006) indicate large impacts of defaults on the yield spreads of the government bonds (e.g., those of the Ottoman Empire) traded at the London Stock Exchange between 1870 and 1914. Lindert and Morton (1989) do not find effects of defaults in the 1930s on borrowing conditions in the 1970s.

Since the mid-nineteenth century, there were signs for the default of the Ottoman state because of higher debt burden (Yeniay 1964, 52). During the nineteenth century, the Russo-Turkish War of 1877-78 was a key event leading to damages in the Ottoman economy and higher debt burden. In the 1870s, there were ongoing rebellions in Rumelia[1], which were responsible for default of the Ottoman state due to their negative effects on its fiscal system and economy (Kıray 1995, 145–146; Birdal 2010, 39). Many researches provide evidence for a negative effect of wars on the redemption of debts. For example, Sicotte, Vizcarra, and Wandschneider (2010), Ho and Li (2014), and Adams (2015) indicate lower prices for government bonds of different countries and periods due to war-related events. Using data for the İstanbul bourse between 1910 and 1925, Hanedar, Torun, and Hanedar (2015) and Hanedar,

[1]The land of the Ottoman Empire in Europe.

Hanedar, and Torun (2016) identify the presence of higher default risk perceptions during several war-related events.

In the Ottoman Empire, fiscal problems were severe and many unsuccessful reforms were implemented, which would have led to an inevitable default. This feature of the Ottoman Empire provides an ideal case to study risk attitude on moratorium in the bond markets. Based on a manually collected data for the price of the General debt bond traded at the İstanbul bourse between 1874 and 1883, this paper aims at providing evidence on when a moratorium is capitalized by investors, while the respective government is on the way of the default. This key contribution of the paper is important, since there was an unsettled discussion in the previous historical studies about when the default of the Ottoman state was realized. The paper sheds further light on the rebellions signalled the moratorium, as there was a lack of dissemination of the news prior to its declaration on 6 October 1875.

Inclan and Tiao (1994) argue that structural breaks in variances or volatilities are the best indicator to identify financial instabilities and risks on repayment of debts. To this end, the paper focuses on sudden changes in volatility of the General debt bond return with the ICSS test in order to examine the presence of an increase in the risk perceptions by investors on the repayment of the Ottoman debts prior to the declaration of the moratorium. The bond was actively traded at the İstanbul bourse. Also, the historical literature mentions the fall of the price in the bond, as the moratorium was approaching (The Times 19 October 1875, 7; Koloğlu 1987, 106; Clay 2000, 298). The findings imply higher risk on the redemption of debts capitalized by investors at the İstanbul bourse during the rebellions' peak months, which were five months before the official declaration of the moratorium. The uprisings could be leading indicator for the default due to higher military expenditures and lower tax income. However, the results do not indicate an alert for all investors to identify the moratorium just before the declaration.

2. The Ottoman Empire and the Default

In the nineteenth century, the Ottoman state had suffered from huge budget deficit due to wars, rebellions, famines, and lack of an efficient fiscal system. The increasing budget deficits were positively related to the debt burden to foreign creditors. The Ottoman state did not use the borrowed money in a productive way, which limited higher production and tax income (Kıray 1995, 146; Birdal 2010, 39). By 1875, only 17 percent of the money borrowed abroad was used for infrastructure investments (Suvla, 1999, p. 287). As it was difficult to find new sources due to higher budget deficits, the Ottoman state borrowed abroad in worse conditions over time (Eldem 1994, 183). This implies that investors lost confidence on the repayment of the debts.

To deal with fiscal problems, a commission in January 1874 was founded, providing measurements to reorganize fiscal system (The Times 7 February 1874, 6). After a long period from the establishment of the commission, *The Times* argued that the measures of the committee were positively related to the amount of fund obtained abroad and tax income (The Times 15 October 1874, 10). However, it seems that rebellions in the 1870s limited the measures of this committee to reform of the fiscal system.

By 1875, the foreign debt was 200 billion British pounds (Kıray 1995, 145). The share of foreign debts in public revenues reached to thirty percent in 1874 (Güran 2003, 54–88). On 6 October 1875, a widely read Ottoman newspaper, *Vakit*, published an article about the declaration of moratorium by the Ottoman state (Vakit 7 October 1875, 1). The moratorium caused loss in investors' confidence leading to lower price for the General debt bond traded at the İstanbul bourse (Fertekligil 2000, 53–55). Kıray (1995, 146) argues that the Ottoman state could not obtain external funds on more favourable terms during its default.

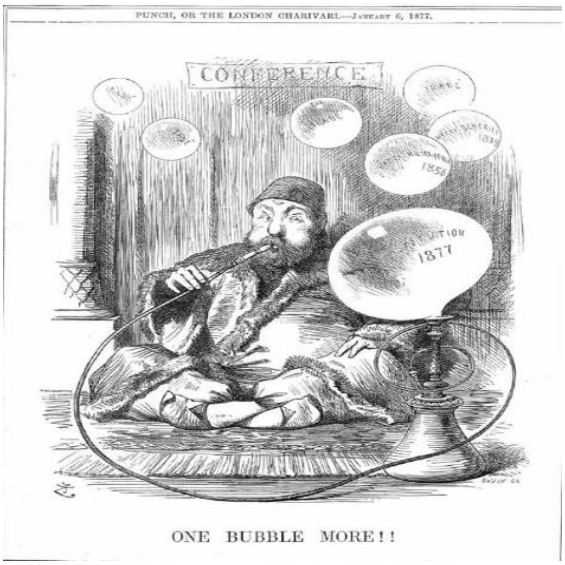
To supervise the repayment of the debts and make fiscal reforms to reorganize the inefficient fiscal system, there were demands of the foreign creditors since 1873 (Yeniay 1964, 52; Kıray 1995, 147–148). After the Russo-Turkish War of 1877-78, this issue was discussed in the Congress of Berlin, which was organized on 13 June 1878 to solve problems in the

Rumelia due to the Russian extension (Vakit 11 June 1878, 2; Clay 2000, 383) On 20 December 1881, by the Muharrem Decree the Ottoman Public Debt Administration (OPDA) (*Duyun-u Umumiye*) was finally established. This organization was controlled by representatives of the foreign creditors, which providing an efficient control on tax collection and payment of debts (Yeniay 1964, 62–67; Birdal 2010, 168–180).

Yeniay (1964, 52) and Al and Akar (2004, 186–187) state that the moratorium was not a surprise by 1875, since debt burden was enormous and there was an unofficial dissemination of the declaration. Koloğlu (1987, 107) and Pamuk (2000, 213) address the capital outflows during the financial crisis of 1873 as an important reason for moratoriums in emerging market economies, such as the Ottoman Empire. Kıray (1995, 145–146) and Birdal (2010, 39) argue that rebellions and famines of the 1870s were positively related to the likelihood of the default through increasing government expenditures. During these periods, there were reforms and institutional changes in fiscal and administrative system, as investors did not see them as promising. In Figure 1, these events were illustrated as bubbles in a British weekly magazine, *Punch*/*The London Charivari*.

Figure 1

An irony cartoon of Punch/The London Charivari on 6 January 1877 about the Ottoman reforms



The Times reported the presence of a panic environment at the İstanbul bourse on 4 October 1875 due to rumours on the default, leading to lower demand for the General debt bond (The Times 19 October 1875, 7). Although government officers kept their meeting on default as secret, Koloğlu (1987, 106) and Kazgan (1995, 78–80) argue the presence of rumours between investors about the default on 2–4 October 1875, leading to lower price of the General debt bond. Clay (2000, 298) points out a fall in the General debt bond price at the İstanbul bourse just before the official declaration of moratorium, arguably because of the presence of an expectation on the default.

3. Data

To examine how the moratorium was reflected in the Ottoman Empire, this paper uses the closing price data at İstanbul bourse for the last phase of the General debt bond issue.[2] By the 1860s, bonds and stocks were informally traded in İstanbul. In 1866, the İstanbul bourse was

[2] The price data for all phases of the bond was used in Hanedar, Hanedar, Çelikay (2017) to examine the effects of reforms. Our paper is a preliminary examination on how the default was capitalized, as a large data set on different bonds, stocks and exchange rates are collecting for future study.

founded and the Ottoman state issued several decrees in 1871 and 1873 to supervise trading activity (Borsa Rehberi 1928 1990a, 112–118; Kazgan 1995, 67–68; Fertekligil 2000, 32, 36). Options trading increased speculative activities at the İstanbul bourse. *To make higher profits, foreign investors* and local money lenders had often disseminated speculative news, which led to price fluctuations (Kazgan 1995, 61–63, 67; Fertekligil 2000, 50, 70–72, 82–90, 102).

The data were manually collected from the available volumes of *Basiret, Ceride-i Havadis,* and *Vakit*. They were daily Ottoman newspapers with a column providing the price of the bond. In the data sources, the price is denominated in Turkish Liras. The paper uses the period between the issuing date (i.e., 23 September 1874) and 9 March 1883, resulting in 1630 observations.[3]

The main data source is *Vakit*, which was first appeared in 1875 as a pro-government newspaper. In several issues, the price was not reported. Also, several issues were not available for different months.[4] In order to fill the gaps, the paper obtains data from *Ceride-i Havadis*, which was first published in 1840 by a British journalist. As *Ceride-i Havadis* reports the morning and mid-day prices, this paper takes the average of two prices. For the period before 1875, the data come from *Basiret*. It was a conservative newspaper and launched in 1869.

To finance short-term debts and budget deficit, the Ottoman state issued bonds in three phases (i.e., 1865, 1873, and 1874). The bonds were called as the General debt bonds. The volume of total trade for the bonds was 95,917,096 Turkish Liras for the period 8–20 December 1881. By issuing the bonds, the Ottoman state collected 48,305,235 Turkish Liras. These figures were the highest, as compared to bonds issued in similar years (Borsa Rehberi-1928 1990b, 90). In the third phase, 42,000,000 Turkish Lira bonds were sold on 18, 19, 20, and 21 September

[3] As there were only three observations for April, May, and September 1883, the paper does not use them in the analysis.

[4] The lack of the data composes of two percent of all observations.

1874. They had face values of 11, 55, and 110 Turkish Liras with a rate of interest of 5 percent per year. The coupons would have been paid on 13 January and July of each year (Yeniay 1964, 49–50). There is no detailed information on the maturity date of the bond, as bonds issued in the other phases were paid back around 35 years, on average (Akyıldız 2001, 316).

4. Methodology

To identify sudden changes in risk perceptions for the repayment of the debts during the default period, this paper uses the Inclan and Tiao's (1994) method, which proposes an iterated cumulative sums of squares (ICSS) algorithm. The ICSS is superior to alternative methods due to absence of fixed restrictions on the estimation procedure, in contrast to Bai and Perron's (1998, 2003) test[5]. The ICSS determines the numbers and dates of structural breaks in the volatility as follows:

$$D_k = (C_k / + C_T) - (k/T)\ k = 1,.....,T\ _{with}\ D_0 = D_k = 0 \qquad (1)$$

In equation (1), $C_k = \sum_{t=1}^{k} \varepsilon_t^2$ represents a cumulative sum of square residuals from the beginning of the series to the k^{th} point in time. The absence of sudden changes in the volatility over the sample period means a D_k statistics which equals zero. In case of a larger D_k statistics than the critical value, the null hypothesis of presence for sudden changes can be accepted.

If there is at least one structural break in the volatility around the date of the declaration with a fall in the bond price, then this could signal that the investors had already discounted the risk of the moratorium.

As the price of the General debt bond could not be stationary, this paper estimates returns for the price of the bond as follows:

[5]This paper also detects break points by using Bai and Perron's (1998, 2003) framework. As it is a parametric method, the findings are no robust to the different data distribution assumption and estimation frameworks, in contrast with those of the ICSS test.

$$R_t = \ln(P_t / P_{t-1}) \qquad (2)$$

where P_t represents the daily price of the General debt bond in time t as the data sources provide information.[6]

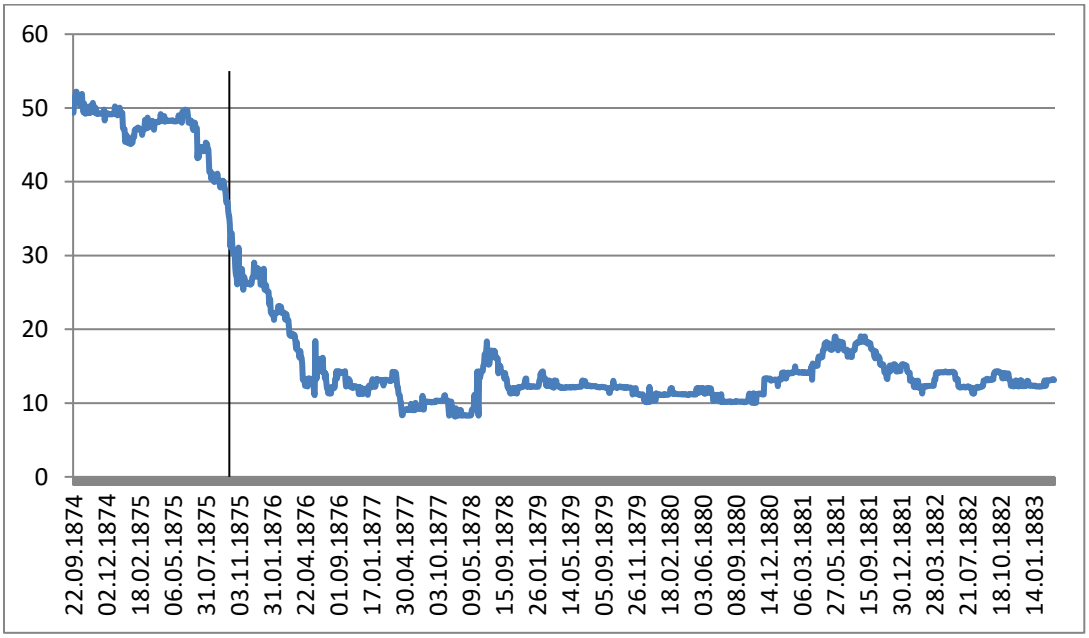
5. Results

5.1 Descriptive findings

Figure 2 presents the daily price of the General debt bond from 1874 to 1883. It shows a downward trend in the price, implying higher default risk due to the fiscal problems of the Ottoman State over the sample period.

Figure 2

The General debt bond price, 1874–1883 (Turkish Liras)



Sources: Basiret, Ceride-i Havadis, and Vakit.

[6] Previous literature focuses on the changes in yield spreads. Following Mauro, Sussman and Yafeh (2006, 136), this paper uses this definition of the bond returns due to the possible payment problems of the coupons during the default period.

There was a gradual fall of the price four months before the declaration of the moratorium which its date is shown with a vertical line. This could mean the presence of the increasing risk for the redemption of debts perceived by investors, as the default was approaching.

5.2 Identification of break times

Table 1 shows break dates in the volatility of the General debt bond return.[7] Basis points reflect the differences between average bond prices after and before the sudden changes.

Table 1

Structural break points in variance for return of the General debt bond, 1874–1883

Break dates	Basis points
13.04.1875	-30.70
20.05.1875	-31.14
11.12.1879	-14.88
23.12.1879	-14.75

There were four statistically significant break points, leading to lower bond price. Two break dates in 1875 coincided with rebellions in the Rumelia. The breaks led to a 30 basis points fall of the bond price, on average. This could imply the presence of an expectation among investors on high risk for the payment of Ottoman debts after March 1875. The other breaks indicate smaller falls in the price, meaning that the future cost of the redemption of the debts decreased by 1880.[8]

[7] GARCH (1,1) estimates provide evidence on the presence for statistically significant effects of these break dates on the volatility.

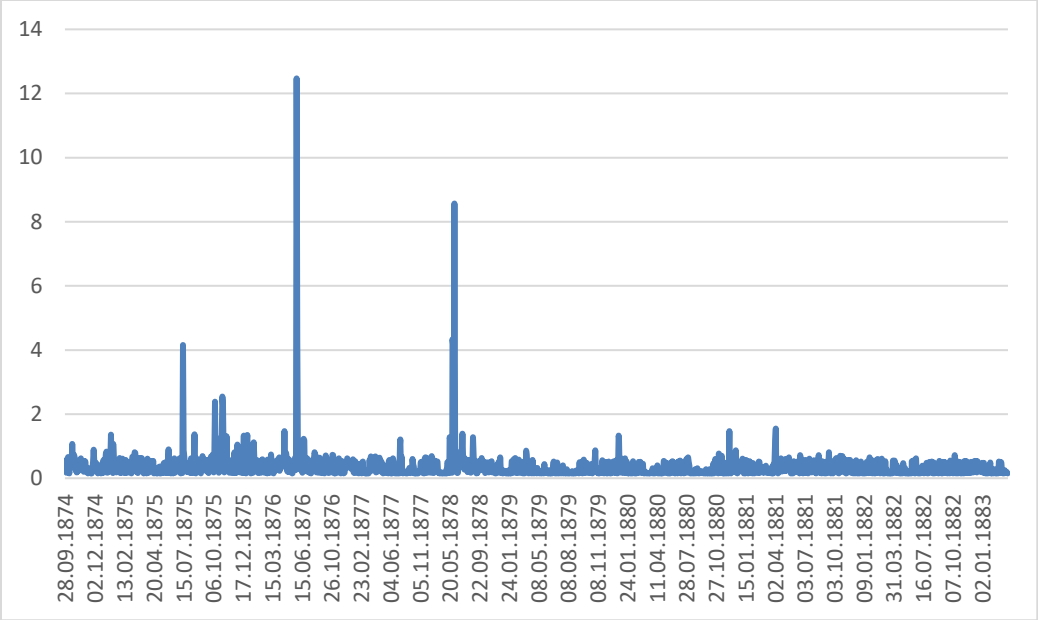
[8] The paper also examines how moratorium was reflected at the Rumelia Railway bond's price, whose data is available for longer period. Since the bond's price could be sensitive to the problems in Rumelia rather than the

5.3 Estimation of conditional volatility

To further examine risk perceptions of investors at the İstanbul bourse over sample period, this paper identifies changes in conditional volatility using SWARCH (2, 1) model proposed by Hamilton and Susmel (1994), as shown in Figure 3. The paper prefers to use SWARCH (2,1) because of its forecasting performance in the presence of the structural breaks, as compared to the traditional frameworks such as ARCH model.

Figure 3

Volatility for the General debt bond return, 1874–1883



There were large fluctuations in the volatility from March 1875 to June 1878. This could be arisen from rebellions and the Russo-Turkish War of 1877–78. The highest peak was observed on 1 June 1876. *Basiret* reported that the Sultan *Abdülaziz was replaced*, as the accession day of new Sultan would be celebrated soon (Basiret 1 June 1876, 1).

default, the paper uses price data for the General debt bond. The findings imply that the default was realized by investors of the Rumelia Railway bond after the announcement, which supports that the default could be surprise (See Figure 1A).

On 2 June 1878, there was another large peak in the volatility, as *Vakit* announced the increased likelihood of the outbreak of new hostilities between Russia and other Major European powers[9] due to the presence of the Russian army around İstanbul after the Russo-Turkish War of 1877–78 (Vakit 3 June 1878, 1). This resulted in the Congress of Berlin on 13 June 1878 by the other Major European powers to deal with the victory and extension of the Russia in the Rumelia after the Russo-Turkish War of 1877–78.

Finally, another large change in the volatility was observed three months before the default (i.e., on 14 July 1875), which corresponded to the intensity of the rebellions in the Rumelia (Koloğlu 1987, 109).

6. Conclusion

The paper examines whether the default of the Ottoman Empire was reflected in the İstanbul bourse prior to the official declaration, based on the volatility changes as a measure of risk perceived by investors on the repayment of the Ottoman debts. There is no evidence for a statistically significant break in the volatility and demand around the date of the declaration of the moratorium. The empirical findings imply break dates in the volatility during April and May 1875, which coincides with intensive rebellions in the Rumelia. The volatility gradually increased from April 1875. The unrests in the Rumelia aggravated the Ottoman debt problem, which could be the leading indicator for the default, as suggested in Kıray (1995) and Birdal (2010).

There were other peak dates in the volatility due to events related to the Congress of Berlin and the deposition of Sultan after the official declaration of the moratorium. This shows the sensitivity of investors at the İstanbul bourse to domestic and international political problems leading to the Congress of Berlin.

[9]The UK, France, Italy, Germany, and Austria-Hungary.

Under lack of a large dataset on the Ottoman fiscal system, the paper contributes the historical discussion on the reflection of default in the Ottoman Empire. Also based on the historical data for the price of an Ottoman government bond, it could be argued that the intensity of the uprisings leading to the growth in the public expenditures could provide information on the increasing default probability for a country that experiences high debt burden prior to the declaration of moratorium. Such events could be good signal for policymakers to react against unanticipated events and fix the financial problems. The paper would be refined, as the data sources provided information on different bonds, stocks and exchange rates.

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Appendix A: SWARCH Model

Hamilton and Susmel (1994) propose SWARCH framework to examine conditional variance of financial series in the presence of structural breaks, which is superior to traditional models such as the ARCH model. The results of SWARCH model for the General debt bond return are presented in Table A1. The coefficients are statistically significant, as the model satisfies the stability conditions of SWARCH framework.

Table A1

The results of SWARCH (2, 1) Model

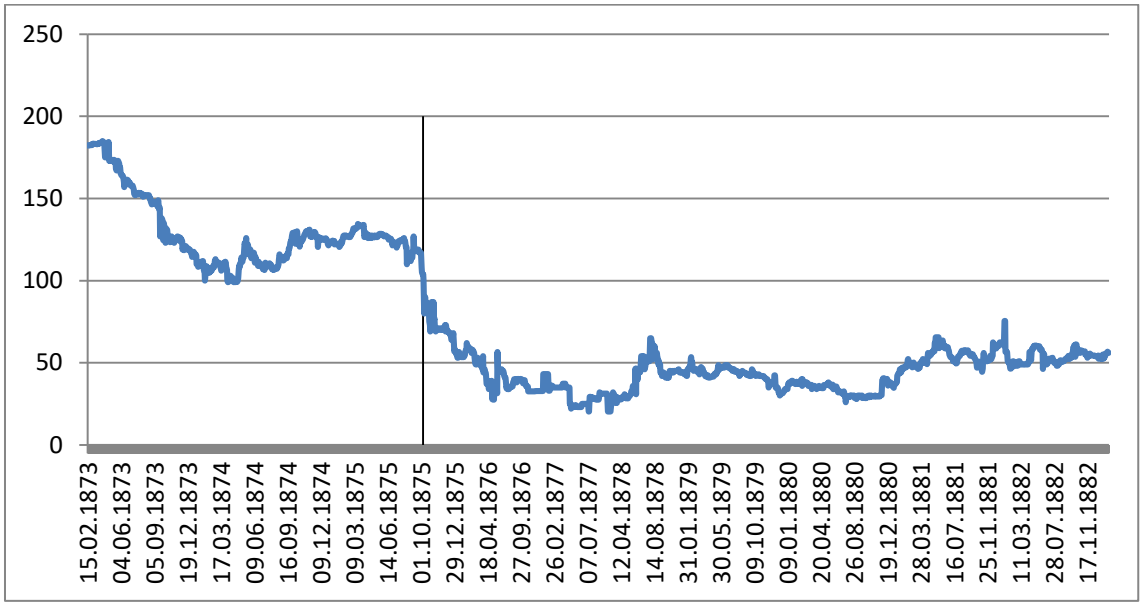
Mean Equation	
Constant	0.001**
$\mathbf{Y}_{t-1}$	0.80*
Variance Equation	
Constant	0.659*
$\mathbf{e}^2_{t-1}$	0.38*
P^{11}	0.89*
P^{22}	0.88*
g_2	5.00

Note: * and ** denote statistically significantly different from zero at the denote 1 % and 5 % significance levels, respectively. P^{11} and P^{22} indicate transition probabilities, as g_2 shows scale coefficient.

Appendix B:

Figure 1A

The Rumelia Railway bond's price, 1873–1883



Sources: Basiret, Ceride-i Havadis, and Vakit.