

## **Institutions, Reforms, and Country Risk:**

### **Lessons from Japanese Government Debt in the Meiji Period\***

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## **Abstract**

We evaluate the effect of the establishment of modern state institutions (e.g. a central bank or a constitution) on the risk premium associated with government debt traded abroad. Drawing on evidence from one of the most dramatic reform periods in modern history, and using data on sovereign debt traded in London between 1870 and 1914, we investigate the impact of major reforms on the yields of Japanese government bonds following the Meiji Restoration. We show that although the risk premium on Japanese debt declined during the period, the establishment of modern, western institutions did not elicit an *immediate* market response. The single institutional reform that significantly reduced the perceived risk associated with Japanese bonds was the adoption of the Gold Standard in 1897. In addition, political events such as the British-Japanese treaty (1902) and the military victory over Russia (1905) improved Japan's debt capacity, and led to a substantial increase in the volume of Japanese debt. We conclude that, at least in the short run, well-understood monetary rules as well as a military achievement matter more for the perception of a country by foreign investors than modern state institutions. Nevertheless, we do not rule out the possibility that in the long run, institutions may have an effect on a country's credit rating.

*JEL Classification:* G15, N2, O16.

## **I. Introduction**

Much has been written about the role of institutions in promoting economic growth. The establishment of a modern state structure with developed judicial, economic and parliamentary systems, can change the way a country is perceived by foreign investors, thus lowering the cost of borrowing foreign capital, facilitating capital inflow and thereby fostering growth. Using data on Japan between 1870 and 1914 - one of the most dramatic cases of institutional change in modern history - we evaluate the effects of major reforms on the risk premium associated with Japanese government debt traded in London. We show that most reforms, including the establishment of a central bank and the promulgation of a modern constitution, did little to affect the way Japan was perceived by British investors, at least not in the short run. The only institutional reform that clearly led to an immediate improvement in Japan's "credit rating" was the adoption of the Gold Standard, which can be viewed as a commitment to modern, stable macroeconomic policy (Eichengreen, 1985, Bordo and Rockoff, 1996). In addition, a political event - Japan's victory over Russia in 1905 - did more to establish Japan's image as a trustworthy borrower than most institutional reforms.

In order to measure the effect of major reforms on bond yields, we use a newly constructed data set on sovereign debt traded in London between 1870 and August 1914. We focus on sovereign debt because governments often play an important role in capital accumulation in early stages of development (especially in nineteenth century Japan, see Rosovsky, 1961). We define the "risk premium" on Japanese government debt as the yield differential between Japanese government bonds traded in London and British Consols. Our monthly data allow us to estimate the magnitude of the market response to major reforms and to the establishment of "modern" state institutions.

We find that the yield differential between Japanese and British government debt declined during the period; also, that Japan's debt capacity increased. Interest rates declined

despite the fact that the volume of debt issued abroad increased substantially, relative both to total debt, and to government revenues.

Despite these trends, we do not find that the establishment of most state institutions was perceived as “news” with an immediate effect on the risk associated with Japanese government debt in London. Almost none of the significant reforms of the Meiji period, e.g. the establishment of the Bank of Japan and the introduction of “modern” monetary policy, the promulgation of the Meiji Constitution, or the introduction of parliamentary elections, produced any quantitatively significant market response in London. This suggests that the establishment of western institutions in a developing country such as nineteenth century Japan, need not be interpreted as credible signs of development or of the government’s ability to repay its foreign debt.

While we find that most reforms mattered little for British investors, two institutional changes were associated with a substantial decline in Japanese bond yields. The first was the agrarian and fiscal reform, which constituted part of the abolition of the feudal system in 1873, and the second was the adoption of the Gold Standard in 1897. The 1873 reform occurred early in our period of observation, and we will argue that it is not clear whether this was the cause for the decline in yields that followed. The Gold Standard, however, led to a dramatic decline in yields and an increase in volume of Japanese foreign debt.

Certain international political events affected yields far more than did the introduction of new institutions. For example, Japan’s victory in the 1904-5 war with Russia was followed by a small decline in yields and, more importantly, by a substantial increase in Japan’s ability to raise capital abroad. It therefore seems that some “certification of quality” can be achieved more quickly through military victories than by means of a modern constitution.<sup>1</sup>

We complete the analysis of market response to institutional change by examining the

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<sup>1</sup> This evidence supports the view that Japanese militarism did not “crowd out” private investment because successful wars led to cheap foreign credit, as argued by Yamamura (1977).

*long-term* changes in the Japanese risk premium and volume of foreign debt. This analysis supports our finding that most institutional reforms, with the exception of the Gold Standard, had little effect on the perception of Japan in foreign capital markets.

We believe the historical analysis of this paper is relevant to the discussion of country risk and foreign capital flows into modern emerging markets. For example, in a recently published advertisement (*International Herald Tribune*, Dec. 11, 1998), the government of Kazakhstan attempted to attract foreign investors by emphasizing the democratic institutions recently established in the country. Our results on the Japanese experience suggest that institutional reforms in a developing country may be a necessary prerequisite for foreign capital inflows, yet they are not always sufficient. This, of course, does not imply that “institutions do not matter” for economic development, but rather that they need not generate an immediate reduction in the cost of foreign capital.

This paper is part of a growing literature on institutions and their economic significance (e.g. North and Weingast, 1989). Methodologically, it is in line with recent studies that apply econometric techniques to evaluate market responses to historical events. Of special relevance is Willard, Guinnane, and Rosen (1996) who use data on the gold price of “greenbacks”, a currency issued by the Union during the American Civil War, to examine the effect of war-time events on financial markets. The methodology they develop, designed to determine if a price change is “long term” or just a “blip”, is similar in spirit to the methodology used here. The paper is also related to the literature on country risk in more recent periods (e.g. Edwards, 1986), and to the literature on the Gold Standard and its impact on borrowing constraints (Bordo and Rockoff, 1996 Eichengreen and Flandreau, 1996). Finally, Suzuki’s (1994) comprehensive historical study of Japanese bond issues in London during the Meiji period is extremely informative, although the methodology and objectives of his study are quite different than ours.

The rest of the paper is organized as follows: Section II provides a historical overview of the Meiji period reforms in Japan. In section III we describe the data used for this study, and present our empirical approach. Section IV presents the results and Section V concludes and outlines possible directions for further research.

## **II. An overview of the Meiji period**

The symbol of Japan's transition to modernization and economic growth is the Meiji Restoration of 1868. Following more than 200 years of isolation under the Tokugawa regime, the old feudal system was abolished, and the newly established government embarked upon an ambitious modernization plan. Massive import of technology and heavy investment in infrastructure financed by the government, as well as the establishment of a modern state structure were all accomplished within a few decades. Rapid economic growth during this period enabled Japan to emerge as an economic and a military power by the turn of the century. Although a detailed historical review of the Meiji period (1868-1912) is beyond the scope of this paper, we provide here a brief outline of the major reforms and historical events which will serve as a background for the empirical analysis which follows.<sup>2</sup>

The upheaval following the forced opening of Japan by Commodore Perry brought about the demise of the shogunate, the old feudal system. This led to a *de jure* restoration of authority to the emperor, and a *de facto* revolution under the leadership of a new government, which was eager to narrow the economic and military gap between Japan and the West. The abolition of feudal domains began in 1869 and was completed two years later. As early as 1871, the first government mission headed by Prince Iwakura, left Japan to "learn from the West". Postal service was established in 1871-1872, and the first railroad was constructed around that time. Compulsory elementary education for both sexes was introduced in 1872,

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<sup>2</sup> For further historical background on Japan in the Meiji period, see Beasley (1990), or Storry (1973).

eight years before its introduction in England and students were sent to study in Europe and the US. Major agrarian and tax reforms took place in 1873, when rice was replaced by currency as means of payment. General conscription and a modern army replaced the traditional samurai warriors in 1873. Telegraph was introduced in the early 1870s, and at around the same time the government imported “model” textile and other industrial plants. The early 1880s witnessed the consolidation of the banking system, the establishment of a modern central bank, the Bank of Japan (1882), and, later on, the introduction of convertible-to-silver yen notes. Under Matsukata as Minister of Finance, Japan restrained the inflation (which resulted mainly from the 1877 Satsuma Rebellion), and began to privatize the industrial plants constructed by the government earlier. During the 1880s, a modern, western, cabinet system was also installed. Possibly the most important institutional reform, the Meiji Constitution, was promulgated in 1889, after nine years of deliberations and attempts to incorporate the best features in the constitutions of Germany and other European countries. The Meiji Constitution, which remained unchanged through the end of World War II, guaranteed the rule of law, property rights, some freedom of speech, as well as occupational freedom for citizens. It also established an independent legal system, and set the ground for a two-house parliamentary system existing in Japan to this day. The first parliament convened in 1890, following the first elections.

Major political events of the Meiji period include the 1877 Satsuma Rebellion, which was led by discontented samurai warriors. Japanese ambition to colonize Korea led to the 1894-5 war with China. Japan’s decisive victory resulted in the annexation of Taiwan and in extremely large reparations imposed on China. In 1900, Japan cooperated with the western powers in the suppression of the Boxer Rebellion in China. In 1902, the British-Japanese military alliance was signed, the first ever alliance signed by England with a non-European country. The struggle for hegemony over Korea and Manchuria led to the outbreak of the war

with Russia (1904-5). The war ended in a major Russian defeat, the first time a European power lost a war to a “developing country”. Indeed, the Russia-Japan war is often described as a watershed in the history of both Japan and Russia. In 1909, a Korean nationalist in Manchuria assassinated Ito Hirobumi, one of the most prominent statesmen of Meiji Japan. In retaliation, Japan formally annexed Korea in 1910. Emperor Meiji died in July 1912. World War I broke out in August 1914.

### **III. Data and empirical methodology**

#### **III.1 The data set: statistical information**

Data on the prices and yields of Japanese government bonds traded in London are calculated from the *London Times*, and include both the coupon interest rate and the actual closing price on the London market at the end of each month. Because our focus is on foreign debt, the series of yields we construct is independent of domestic monetary policy.<sup>3</sup>

Based on the coupon interest rate and the market price, we calculate Japanese bond yields between 1870 and August 1914. In our benchmark calculations, yield equals the ratio of interest payments to market price, a reasonable approximation for long term bonds. Indeed, the maturity of Japanese bonds was thirteen to twenty five years prior to 1897 and about sixty years thereafter.<sup>4</sup> As an alternative estimate of bond yields for the pre-1897 period, we calculate yield to maturity (“buy and hold” returns). In addition, contemporary issues of the *Economist’s Investors’ Monthly Manual* also include yield data which differ somewhat from

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<sup>3</sup> Moreover, data on domestic bond yields do not exist for Japan until the beginning of the twentieth century.

<sup>4</sup> The first bond issue, in 1870, was with maturity of thirteen years, to be redeemed in ten annual drawings starting in 1873. Starting in 1873, the Japanese government issued twenty-five year bonds, which could also be redeemed before maturity. Indeed Japan withdrew much of the 1873 debt by 1897 through a series of “lotteries” in which a fraction of the outstanding bonds was redeemed. Post-1897 bonds were mostly long-term, with maturity of up to sixty years, although during the war with Russia short term bonds were issued as well. The Japanese government could (and did) retire some of the bonds before the end of the period, but only with “adequate” advance notice. In any case, bonds could not be redeemed earlier than five (in some cases ten) years after the issue. The fact that some fraction of the bonds could be “called” by the government before maturity implies that calculating yield to maturity is not straightforward and should, in principle, incorporate also the probability of early redemption.

the other two calculations, and appear to be more volatile. Although no information on the method of calculation is provided, we examine this series as well as it may reflect the views of contemporary investors. The three series are identical before 1880 and after 1897, and closely correlated in the 1880s, but differ in the years before the bond redemption of the mid-1890s (see Appendix Figure 1-A). Nevertheless, the method of calculation does not qualitatively affect any of the conclusions reported below. We return to the issue of bond maturity when we discuss the impact of the war with China and the Gold Standard on yields.

In addition to monthly bond data, we also collect *daily* bond return data around the promulgation of the Constitution and the adoption of the Gold Standard. These data are described in detail in the next section.

British Consol yields are obtained from the NBER Macroeconomic History data set. Since we are interested in market responses of bond yields to institutional change, we define the difference between the yield on Japanese bonds and the concurrent yield on British Consols as the “risk premium”. Because coupons on Japanese bonds were payable in pounds Sterling in London, no exchange rate risk was associated with their yields.

Annual data on the volume of Japanese government debt as well as on government revenues, and other macroeconomic variables are drawn from the Bank of Japan’s Hundred Year Statistics of the Japanese Economy, supplemented by data on long term capital flows and GNP from Mitchell’s International Historical Statistics. It should be noted that GNP data for Japan are not available before 1885.

### **III.2 The data set: British press reports on events in Japan**

To supplement the statistical information, we record every report on political or economic event in Japan reported in the *London Times* between 1870 and 1899. These data, as well as articles from the *Economist*, are used to evaluate the nature of information British investors had on reforms in Japan and on other events that could affect the risk associated

with Japanese government bonds. Before Japan was connected to the international telegraph system in 1876, it took news from Japan two months to reach England by mail steamers. After 1876, news from Japan could be reported without delay.

### III.3 Methodological approach

We use several statistical procedures to determine if a particular institutional reform or historical event caused an immediate change in the risk premium associated with Japanese debt.<sup>5</sup> We then turn to investigate long-run trends in Japanese foreign borrowing. This part of the analysis focuses mainly on the volume of Japanese foreign debt (that is on “quantities” rather than “prices”). We thus provide both a short and a long-run view of the effect of institutional reform and other important events on Japanese foreign borrowing.

#### *The basic specification*

Our basic specification is designed to test statistically if *known* historical events (e.g. the establishment of a central bank) caused a significant change in the risk premium associated with Japanese government bonds. The regression specification is based on Perron (1989). First, we construct an eighteen-month “window” around the month in which a single major historical event took place. This guarantees our ability to identify the impact of every event independently of the influence of other events.<sup>6</sup> The time frame of each “window” enables us to identify effects that last for about one year. For example, the “window” for the Meiji Constitution, which was promulgated in February 1889, begins in June 1888 and ends in November 1889; the parliamentary elections of 1890 are not included in this time period. Using the data contained in each “window”, we estimate the following regression equation:

$$(1) \log (\text{Risk Premium})_t = \beta_0 + \beta_1 \log (\text{Risk Premium})_{t-1} + \beta_2 \Delta \log (\text{Risk Premium})_{t-1} \\ + \beta_3 \Delta \log (\text{Risk Premium})_{t-2} + \beta_4 \text{TREND} + \beta_5 \text{EVENT}_{long} + \beta_6 \text{EVENT}_{short}.$$

<sup>5</sup> An alternative approach is that of Calomiris (1994) who relies on case studies to analyze how certain institutional changes affected the US’s credit risk in the nineteenth century.

<sup>6</sup> It is, of course, possible that other events, which Japanese historiography did not deem important, are also included in the “window”. A division of the sample into short “windows” is part of the Willard et. al. (1996)

The dependent variable in Equation (1) is the natural logarithm of the yield difference between Japanese government bonds and British Consols. The impact of a historical event on the risk premium is measured by two dummy variables for each event. The first,  $EVENT_{long}$ , takes the value zero at all times prior to the event and the value one from the time of the event onwards. The second,  $EVENT_{pulse}$  takes the value one at the date of the event investigated and zero at all other times. For example, a permanent one-time break in a trend stationary series would be reflected in  $\beta_1 < 1$ ,  $\beta_4 \neq 0$ ,  $\beta_5 \neq 0$ , and  $\beta_6 = 0$ . Other right-hand-side variables include the logarithm of the risk premium lagged one year and increments in the risk premium lagged one and two years to correct for various forms of serial correlation. A time trend is included only in “windows” where it is significant.

A possible drawback of this approach is that the “windows” may be too short, either containing too few observations, or covering too short a period. In addition, Christiano (1992) and Zivot and Andrews (1992) have criticized the Perron methodology on two main grounds. First, Christiano shows that the Perron test will tend to reject the null-hypothesis of no breaks “too easily”, that is, the critical values for the significance of the dummy variables are higher than the ordinary  $F$  or  $t$  values. In our case, this means that we may over-estimate the statistical significance of reforms and institutions. Second, both Christiano and Zivot-Andrews argue that Perron’s identified breaks (in the US GNP series) are “endogenous”, that is, are based on preliminary observation of the data and informal search for breaks. This second critique is irrelevant for the study of institutional reform, where possible break dates are exogenously given historical events. Nevertheless, because events may have been anticipated prior to their actual date, we examine two alternative test specifications (as suggested by Christiano and Zivot-Andrews), which are based on a search for breaks over the entire data without assuming any break date *a priori*.

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approach as well.

### *Iterative search for breaks*

This test uses the entire forty-some years of risk premium data for repeated estimation of Equation (1) while moving the break date and the corresponding *EVENT* dummy variables one month at a time and recording their statistical significance. The sample is then split in two at the point where the statistical significance of the *EVENT<sub>long</sub>* dummy is highest, and the process is repeated within each half of the sample until no break points are detected in any sub-sample.

### *The “moving windows” approach*

An alternative method for searching for breaks at unknown dates in the risk premium series is by “moving the windows” one month at a time, estimating Equation (1) within each “window”, and recording the dates that yield *EVENT<sub>long</sub>* dummies with the highest statistical significance (as in Willard et al., 1996).

### *A “Long-run” analysis*

In order to search for “long-run” effects, we use annual data to investigate changes in the risk premium and the volume of foreign debt. Following the literature on present-day country risk (Edwards, 1986), we estimate a co-integration equation designed to establish the long-run relationship between the risk premium on Japanese government debt and macroeconomic variables such as the ratio of government debt to GNP or the fiscal deficit. We also estimate the relation between the Japanese risk premium and the nature of British newspaper reports on events in Japan.

Much of the “long-run analysis” focuses on “quantities” rather than “prices”, that is, on the mix of foreign and domestic debt chosen by the Japanese government. This is done by estimating (using co-integration) the relation between the ratio of foreign debt to total debt and the risk premium, as well as by examining (graphically) the evolution of Japanese foreign borrowing in the Meiji period. This analysis enables us to assess the relative importance of

demand and supply shifts in the London market for Japanese government bonds. A negative relation between the ratio of foreign debt to total debt and the risk premium (increases in the “quantity” of capital borrowed are accompanied by declines in its “price”) are consistent with movements along the Japanese capital demand curve in response to downward shifts in the British supply curve. A positive relation implies that upward shifts in the Japanese demand for foreign capital resulted in an increased risk premium.

#### **IV. Results and discussion**

##### **IV.1 Japanese bond issues in London - an overview**

Japanese debt was first issued in London in April 1870. The *London Times* described this relatively small issue of one million pounds as follows:

“The radical changes which have recently taken place in Japan and their important effects, not only on the Japanese themselves, but upon the commercial relations with foreign countries, have been recognized by all who have knowledge of the vast resources and the productive power of that Empire. The natural result of this improved state of things has been the desire on the part of the government of Japan to develop the resources of that Empire by the introduction of railways, and to the accomplishment of that object the present loan is mainly designed...” (April 26, 1870, p. 8).

Table 1 displays the dates, volume and coupon interest rates for Japanese government debt issued in London. >From 1870 to the early 1900s, coupon interest rates on newly issued Japanese government bonds declined from 9 percent (or about 200 percent higher than Consol yields at the time), to about 4 percent. Fast capital accumulation in Japan during the period (Rosovsky, 1961), as well as the increased integration of world capital markets (Bordo and Rockoff, 1996), may have led to a lower risk premium in the long-run. It is also evident that the volume of debt issued in London (as well as in other markets) increased dramatically, especially around the turn of the century, after the adoption of the Gold Standard.

Figure 1 describes the risk premium on Japanese government debt from 1870 to August 1914. Again, observe that yields on Japanese government debt decreased from about 6 percentage points above British Consol yields in the early 1870s to slightly more than 2

percentage points above Consol yields toward the end of the nineteenth century. Yet not all developing countries enjoyed a decline in their cost of capital at that time, despite the improved integration of global capital markets. For example, yields on Russian and Turkish bonds did not fall during the period. In fact, we argue elsewhere that although interest rates on sovereign debt of countries “on” the Gold Standard moved together, changes in world interest rates cannot explain short-term changes in the Japanese risk premium.<sup>7</sup> Fluctuations in the Japanese risk premium should therefore be explained by Japan-specific events, and not by events in England or in global capital markets; these should have affected all developing countries equally. For example, the decline in Japan’s risk premium cannot be accounted for by an increase in the amount of British capital seeking high returns abroad, because such an increase would have affected yields in all “emerging markets.”

It is clear from Figure 1 that the decline in Japanese yields was not smooth. While yields fell in the 1870s, they remained flat (or increased moderately) from the early 1880s until the mid-1890s. While the decline in yields in the 1870s coincided with some important changes in Japan (e.g. the abolition of the feudal system, consolidation of the banking system, suppression of a counter-reform rebellion), the 1880s witnessed the establishment of some of Japan’s most important state institutions: The Bank of Japan (established in 1882) and modern monetary policy, a modern cabinet system similar to that of advanced western countries, an elected parliament, and the Meiji Constitution of 1889 which guaranteed explicitly the protection of property rights and the rule of law. Apparently, these changes were difficult to evaluate at the time, and therefore had no effect on the London market perception of Japanese debt.

The absence of any significant effect of institutional reform on the London capital market is echoed in the data on the volume of foreign borrowing and the composition of the

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<sup>7</sup> See Sussman and Yafeh (1999) for a discussion of the co-movement of Japanese debt yields and yields on sovereign debt of other contemporary developing countries.

Japanese government debt. Figure 2 shows the development of capital flows and the ratio of foreign to total debt. With the exception of two debt issues floated in London during the early 1870s, the period of institutional reform was characterized by *negative* capital flows, in part because of payments to service and retire foreign debt. This outflow of capital is reflected in the share of foreign debt out of total debt, which *declined* steadily until 1897. The trends of both capital flows and the share of foreign debt were reversed following the adoption of the Gold Standard, and reached a peak of capital inflow using foreign debt during the war with Russia.

In order to clarify how well informed were market participants in London we classify newspaper articles dealing with Japan in the *London Times* into several categories. Articles dealing with political instability and wars; articles dealing with economic and commercial news; articles dealing with diplomacy and foreign policy (e.g. treaties with foreign countries); and articles dealing with reforms and institutional change, see Table 2. During the 1870s, the majority of reports in the *Times* dealt with political instability and wars, most notably the Japanese navy's attack on Taiwan in 1874 and the counter-reform Satsuma Rebellion of 1877. The few reports on institutional change against this unfavorable backdrop were apparently not enough to affect the high risk premium associated with Japanese government bonds in that decade. The 1880s had fewer reports on instability (mostly dealing with political unrest around the promulgation of the Meiji Constitution), and had far more reports on the Japanese economy and on institutional change. In the last decade of the century, British press reports from Japan emphasized the war with China (1894-5) and the Gold Standard. Overall, the risk premium on Japanese government debt reflected the nature of information British investors had on Japan. The increase in the number of "positive" articles on economic change, diplomatic ties with foreign nations and institutional reforms coincided with the trend of declining risk premia. Nevertheless, the reforms of the 1880s did not seem

to be as thoroughly covered as the instability of the 1870s or the Gold Standard and the war with China of the 1890s. Consequently these events did not win the appreciation of British investors.<sup>8</sup>

#### **IV.2 Did institutions lower the cost of foreign debt? Evidence from changes in yields**

Estimates of the “long” and “pulse” dummy variables for major historical events of the Meiji period are displayed in Table 3.

##### *The 1870s*

Consider first the agrarian and fiscal reform of 1873. The negative and significant “long” dummy on this event suggests a dramatic “permanent” (for the duration of the “window”) decline in the Japanese-British yield difference of about 1.5 percentage points (of a total of about 4 percent). This may well be due to fact that the new tax system proved successful, and provided a significant part of the Meiji government revenues. Nevertheless, it is difficult to be certain that the reform was indeed the cause of this break. The risk premium associated with Japanese bonds, first issued in London in 1870, may have been especially high, just like initial stock offerings of firms that go public for the first time (“IPO underpricing”). It is therefore quite possible that the institutional changes of the early 1870s were not the reason that the 1873 bond issue had a coupon rate of 7 percent, compared to 9 percent on the first issue in 1870.

To further shed light on the events of 1873, it is interesting to examine consular reports from Japan during the period. For example, it is reported that the first Japanese official report on public finance was issued in June 1873 to counteract rumors that the government would run a major deficit (British Parliamentary Papers, Embassy and Consular Commercial Reports - Japan, Volume 6, p. 11). The view of Japan during the period was as:

“being as yet neither endowed with nor fit for parliamentary institutions, there is no public body which has the power to look into or control the national accounts. The public has therefore no

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<sup>8</sup> The picture that emerges from the *Economist* is similar: Many of the articles focus on political instability and macroeconomic conditions, whereas relatively little attention is paid to institutional reforms.

guarantee... that the figures... are correct” (p. 13).

In addition to indicating that institutions mattered for British investors, this report suggests that the decline in yields on Japanese bonds may have been a response to the improved and clearer information provided by the government rather than to the agrarian and fiscal reforms. The provision of information by the Japanese government was probably of great importance during the early 1870s because Japan was connected to the international telegraph network only in 1876.<sup>9</sup> Another explanation for the declining yields in the 1870s is provided later in the same volume of Parliamentary Papers (p. 187). Here it is reported that the Japanese government was about to intervene in the bond market after previous issues had been substantially discounted.

An event that may have caused yields to decline in the later 1870s is the suppression of the anti-reform Satsuma Rebellion in late 1877, which could have proved to investors that pro-reform forces were indeed powerful in Japan. The suppression of the Rebellion, however, did not cause a significant market response (Table 3). This suggests that the declining yields in the 1870s were not necessarily due to institutional reforms, although the important changes that took place in Japan during this decade may have had a cumulative effect that reduced the risk premium.

#### *The 1880s and 1890s: Institutional reforms and the Constitution*

In this sub-section we examine the series of major institutional changes that took place in Japan in the last two decades of the nineteenth century. As apparent from Figure 1 and Table 3, no institutional change occurring before 1897 constituted a major break in Japanese bond yields. Even the establishment of the Bank of Japan in 1882 (described in detail by the *Economist*), the promulgation of Meiji Constitution of 1889 and the first parliamentary elections of 1890 did not lead to a significant reduction in the risk premium

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<sup>9</sup> The *Economist*, in an article published on January 18, 1873, strongly criticizes the lack of adequate information on Japanese public finance.

associated with Japanese debt.

It is, perhaps, not surprising that British investors were not impressed by the establishment of the Bank of Japan, which followed several unsuccessful attempts to reform the banking system in the late 1870s. We find the lack of impact of the Meiji Constitution of February 1889 more intriguing, and investigate the market response to its promulgation in more detail. As is evident from Table 3, monthly data indicate that the Constitution was not associated with a significant change in yields. We therefore examine press reports dealing with the Meiji Constitution. There are five detailed articles describing the Meiji Constitution in the *London Times* in February and March of 1889: British investors were clearly well informed (and in real time) regarding the on-going changes in Japan. The Constitution was described favorably as a major step forward, granting Japanese citizens substantial liberties, and more importantly, establishing an independent judicial system, a feature that was very highly regarded by the *Times*. At the same time, the Emperor's divine status and the limited accountability of the cabinet to the parliament were criticized. The overall impression of the Constitution was mixed, a feature, which may account for the lukewarm market response.<sup>10</sup>

In order to examine further the impact of the Constitution, we supplement our data set by collecting *daily* bond yield data from January to April 1889. Without assuming break dates *a priori*, we search for breaks in the daily yield series using the method of “iterative search for breaks” for estimating Equation (1), as described above. We detect no major changes in yields around the dates in which the Constitution was discussed in the *London Times*, although the daily data exhibit a very moderate decline in yields during February and March of 1889, captured by the trend variable in the regression (not shown). We conclude that British investors were not convinced that the Constitution would prove a major turning

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<sup>10</sup> Some historians have argued that the Meiji Constitution did not prove to be as big a change as anticipated, because politicians prevented the judicial system from attaining complete independence. We still focus on the Constitution because it is often described as a major historical landmark and as the main symbol of change in Meiji Japan. It is also clear from contemporary news articles that it was considered an important event not only

point, and did not modify their perception of the Japanese government following its promulgation.

The only event during the 1880s, which had some impact was the introduction of yen notes convertible to silver (see Table 3). The introduction of silver convertibility in 1885 was associated with a relatively small (though statistically significant), decline in yield levels.<sup>11</sup> We interpret this finding as evidence that while the credibility of institutional reform in general was hard to evaluate, the adoption of well-known economic “rules of the game” did elicit a positive market response.

### *The Gold Standard*

The most dramatic reform of the Meiji period (in terms of its influence on the Japanese bond yields) was the adoption of the Gold Standard in 1897. In its aftermath, the yield differential between Japanese and British bonds declined from approximately four percentage points to a two percent premium. The observed decline was due to the complete withdrawal of the 1873 seven percent bonds, and the issuance of new, five percent bonds. Moreover, the newly issued bonds were of much longer maturity - over fifty years (with restrictions on early redemption), compared to twenty-five years on previous issues. This suggests that part of the post-Gold Standard decline in yields could be attributed to investors’ expectation of continued decline in interest rates after the adoption of the Gold Standard. Stated differently, to the extent that the Gold Standard was interpreted as evidence of future macroeconomic stability in Japan, the Japanese government could issue long-term debt without having to pay a maturity premium.<sup>12</sup>

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in retrospect but also around the time of its promulgation.

<sup>11</sup> When using yield to maturity or the *Economist’s* yield series (instead of the ratio of interest payments to price), the effect of silver convertibility appears to be somewhat bigger, see Appendix Figure 1-A.

<sup>12</sup> Because the entire stock of old Japanese government bonds was redeemed, we do not formally estimate the impact of the Gold Standard on yields using the Perron methodology. This is because when the bonds approached maturity their yield approached the short-term risk-free interest rate (or prices approached the coupon redemption value), see Figure 1-A. The decline from seven to five percent is therefore likely to be an over-estimate of the impact of the Gold Standard, since market yields in the early 1890s (before the approaching redemption began to drive them upwards) were already around six percent. The *Economist’s* yield series also

Judging by reports in the *Economist*, the Japanese government was well aware of the impact of the Gold Standard on her borrowing ability:

“Japan is very much in earnest over the adoption of the gold standard. The principal motive for this change, however, is.... because the (Japanese) government find(s) it necessary to borrow money abroad, and the opinion prevails that Japan as a gold standard country would command higher credit, and be able to borrow on more favourable terms in foreign countries than she would as a silver-standard country. There is also an idea that as Japan now considers that she has the right to be regarded as a first-class Power, she ought to adopt for her currency the same standard of value as other first-class Powers ” (April 24, 1897, p. 603).<sup>13</sup>

Tamaki (1995) also argues that the reason Japan wanted to go “on” the Gold Standard was because “London... could supply resources to any country... albeit on the Gold Standard” (p. 82). Indeed, Matsukata, the Minister of Finance, had been advocating the Gold Standard since the mid-1880s. The importance of the Gold Standard is reflected also in a number of reports in the *London Times* in the spring of 1897 describing its expected adoption later that year. Historical documents examined by Suzuki (1994) also indicate that the 1897 bond issue (which coincided with the adoption of the Gold Standard) commanded such interest that it was more than six times over-subscribed.

In addition to a decline in yields and increased interest, the adoption of the Gold Standard was accompanied by an increase in the volume of debt issues by the Japanese government in London, as is evident in Figure 2 (see also Table 1 above). Figure 2 clearly indicates that within a few years following the adoption of the Gold Standard, Japanese foreign debt increased to around 20 percent of total Japanese debt. The adoption of the Gold Standard resulted in a substantial inflow of capital to Japan at a cost that was much lower than ever before. Unlike the establishment of a modern state structure, the Gold Standard was apparently interpreted as evidence of significant development in Japan.<sup>14</sup>

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suggests that yields were approximately six percent before increasing close to the 1897 redemption date (also in Figure 1-A). In addition, note that the 1897 issue was essentially conversion of domestic debt.

<sup>13</sup> Suzuki (1994) cites Finance Minister Matsukata’s memoirs on this issue as well. Note that the same article refers also to “political economists” who warned Japan against possible adverse effects of the Gold Standard on her foreign trade.

<sup>14</sup> In Sussman and Yafeh (1999) we explore the post-Gold Standard integration of Japan into world capital markets in more detail.

While the discussion so far suggests that the Gold Standard was the most important break during the entire Meiji period, it is important to bear in mind that its adoption was the culmination of a series of economic reforms and political changes. For example, a central bank and “modern” monetary policy are prerequisites for the Gold Standard, as is the accumulation of substantial gold reserves, which Japan obtained as reparations from China in the aftermath of the 1894-5 war. What we wish to emphasize, however, is that the London bond market responded strongly to the adoption of the Gold Standard itself, but not to the necessary changes that preceded it. It is also possible that yields declined in response to the adoption of the Gold Standard because it represented a form of collateral for the Japanese government debt.

It is interesting to note that the effect of the Gold Standard on the ability of the Japanese government to raise capital abroad resembles its effect on other countries. Gregory (1979) documents a massive capital inflow into Russia following its adoption of the Gold Standard, at about the same time as Japan did. Nevertheless, while Japan enjoyed a reduction in the cost of capital as well, no such reduction occurred in the Russian case. Bordo and Rockoff (1996) find that countries that were committed to the Gold Standard “as a good housekeeping seal of approval” (e.g. Canada and Australia) enjoyed lower risk premia in the period of 1870-1914 relative to countries that went “on” and “off” the Gold (e.g. Brazil).<sup>15</sup> Our results indicate not only that the Gold Standard was important for Japanese foreign debt, but also that other more dramatic institutional reforms were not.<sup>16</sup>

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<sup>15</sup> This view is challenged by Flandreau et. al. (1998) who argue that interest rate convergence enabled the adoption the Gold Standard rather than the other way around.

<sup>16</sup> The promulgation of the Civil Code in 1896 (three chapters) and 1898 (two more chapters), could have also affected the risk premium in the period around the adoption of the Gold Standard. We believe, however, that this is highly unlikely because the Civil Code was never discussed in the British press, and also because its promulgation is hardly ever mentioned in *any* historiography of Meiji Japan we are aware of. In addition, the risk premium may have declined if the increase in Japanese borrowing made the bonds a more “liquid” asset, although there is no evidence of illiquidity prior to the Gold Standard. Finally, the adoption of the Gold Standard was accompanied by restrictive monetary policy by the Bank of Japan that may have contributed also to the decline in the risk premium.

*Major political events: Wars with China and Russia and the British-Japanese Treaty*

We turn to the effect of the major political events during the Meiji period. The effect of the war with China in 1894-5 (ending in dramatic Japanese victory and 38 million pounds of reparations imposed on China) is described in Figure 3.<sup>17</sup> The outbreak of the war caused an increase of ten percent in yields (Table 3), but overall brought about no substantial change in the yield difference between Japanese and British bonds, or in the volume of Japanese debt issued in London. The market, it seems, could not make much out of these internal Asian affairs, and did not view Japanese success in this war as a sign of economic modernization.<sup>18</sup>

Another political event that had an effect on the risk premium is the British-Japanese military alliance of 1902. The London market welcomed the treaty enthusiastically, and the Japanese risk premium fell by seven percent (see Table 3).

The political event that had the strongest impact on the cost of raising capital in the London bond market was the Russia-Japan war, as shown in Figure 4.<sup>19</sup> In the historiography of modern Japan, this war is often described as a major watershed. Not only did the war prove Japan's military might, it also proved its capacity to produce arms and armaments, and was followed by a "boom" for Japan's heavy industries (Yamamura, 1977). In terms of Japanese debt, the war with Russia seems to have had both a short and a (relatively) long-term effect: Before the war, Japan was perceived as the "underdog," and yields on Japanese government bonds rose dramatically, reaching the highest level of the decade in early 1904. Subsequent Japanese victories over Russia led to a decline in the perceived risk of

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<sup>17</sup> In this case the short-run impact of the war is estimated using a dummy variable that equals one only in the month in which the war broke. The long-run effect of the war is measured using a dummy variable that equals one from the end of the war through the end of the "window."

<sup>18</sup> This is despite an interesting report in the *Economist* (January 26, 1895), in which the results of the war with China are described as evidence that Japan's military might was comparable to that of a European power. A possible reason for the absence of long-term impact may be the approaching maturity of the 1873 bonds discussed above, which may have prevented bond yields from declining in response to the victory over China.

<sup>19</sup> Because of its length, the "window" around war with Russia is a two years long. As in the war with China, the short-run impact of the war is estimated using a dummy variable that equals one only in the month in which the war broke. The long-run effect of the war is measured using a dummy variable that equals one starting from the battle of Lushon (which established Japan's victory in the war about half a year prior to its formal conclusion)

Japanese bonds; yields returned to their prewar levels in 1905 and continued to decline, albeit slowly, until about 1910 (see Figure 1).<sup>20</sup> Much more important than the relatively small decline in yields, the war with Russia was followed by an increase in the Japanese government's ability to borrow abroad. As a percent of government revenues, debt increased from about 200 percent around 1900 to over 400 percent in 1905. Most of the new debt was issued abroad: foreign debt accounted for about half of total outstanding Japanese debt after the end of the war with Russia, relative to about one fifth around 1900 (see Figure 2). Foreign debt could now be issued in foreign bond markets other than London, for example, Paris, New York, Hamburg, and Berlin (Suzuki, 1994, Tamaki, 1995); and indeed, the Japanese government issued debt five times within a period of nineteen months. Japanese debt accounted for about a fifth of new sovereign debt issues in London during this period (Suzuki, 1994). New long-term bonds at low interest rates quickly replaced the costly, short-term bonds issued during the war. Moreover, following the victory over Russia, foreign debt was issued not only by the Japanese government itself, but also by quasi-governmental institutions (e.g. Tokyo Harbourworks, Osaka Electric Tramway, the South Manchurian Rail Company, and the Imperial Industrial Bank of Japan), municipalities and even some private Japanese companies (e.g. Kanegafuchi Spinning). And there is yet more evidence on the impact of the war. Underwriting commissions on Japanese bonds, another measure of risk, declined by a third (!) after the victory over Russia, and furthermore, the Japanese government was no longer required to back its debt by securities (e.g. customs income) deposited in London (Suzuki, 1994).

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through the end of the "window".

<sup>20</sup> Our statistical test confirms that the war had both short-term effects (an initial increase in perceived risk) and a long-term "certification of quality" effect which led to further decline in the risk premium associated with Japanese debt. It should be noted, however, that the analysis of the Russian war "window" overestimates the true effect of the war on yields. Table 3 suggests a long-run decline in yields of about 9 percent from the end of the war onwards, yet Figure 1 indicates that much of the post-war decline in yields reflects a return to prewar levels not captured by the relatively short war "window." The fact that yields stopped falling around 1910 was probably due to poor market conditions (even for British issues), or due to a failed bond floatation that resulted in under-subscription (Suzuki, 1994). Another possible reason is the increase in the Japanese government's

The fact that military victory over Russia improved Japan's credit rating is explicitly stated in many news articles. For example, after 1905 there was concern in Britain over the burden of Japan's war expenditures. The *Economist*, however, advised its readers not to worry because

“the sagacity with which the finances of Japan have been administered during a period of stress and anxiety is a good augury...” (February 23, 1905, p. 2072).

And a later *Economist* article titled “Japan as a Borrower” explains the “phenomenal success” of Japan's loan operations as

“...due about equally to the enhanced reputation of Japan by reason of her military and naval exploits, and the skillful manner in which her loan flotations have been conducted...” (July 20, 1907, p. 1212).

It seems that Japan could withstand investors' concerns (expressed in many news articles) regarding its increasing fiscal deficit in the second half of the first decade of the twentieth century because of the reputation acquired during the war with Russia.<sup>21</sup>

### *Robustness Tests*

We now turn to discuss the sensitivity of our results to alternative specifications. First, recall that Perron-style tests tend to accept breaks too easily. Despite this, we have not been able to identify any major break caused by an institutional reform, except for the Gold Standard. Can expectations account for the fact that the 1880s' reforms had such a small impact on debt yields? Did breaks occur at dates prior to official announcements of major changes? We examine whether there are any other dates during the institutional reform period in which a major change in the risk premium occurred, and find none. First, by observing Figure 1, it is clear that the entire period of institutional reform was characterized by non-decreasing yields, and there seems to be no break prior to the major reforms. More formally, following Christiano (1992) and Zivot and Andrews (1992), we search for breaks in the yield data without assuming them *apriori* using the “iterative search” and the “moving

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budget deficit towards the end of the Meiji period.

<sup>21</sup> In addition to the political events examined in this section, it is also possible to investigate the effect of political assassinations (as indicators of internal stability) on the risk premium. We find that the most important political murder of the period, the assassination of Prime Minister Ito Hirobumi in 1909, had a positive effect on

windows” methods to estimate Equation (1), as described above. Both methods confirm that institutional reforms had little impact on yields: no major breaks (other than the introduction of convertible to silver notes in the mid-1880s) can be detected during the reform period of the 1880s. The “iterative search” identifies the outbreak of the war with Russia as a (relatively minor) turning point in the post-Gold Standard period; the “moving windows” search method identifies short-term “blips” around both the war with China and the war with Russia, but overall, our conclusions remain unchanged.<sup>22</sup> Finally, we detect no breaks (other than the introduction of convertible to silver yen notes mentioned above) in the 1880s when we use yield to maturity data or the *Economist’s* yield series instead of the ratio interest payments to price (see Figure 1-A).

#### **IV.3 Did institutions lower the cost of foreign debt? - A long-run analysis**

In this section we focus on factors that determined the risk premium and the composition of Japan’s sovereign debt (foreign and domestic) in the long run. First, we establish that the risk premium on Japanese debt was “rational.” The positive relation between the risk premium and the ratio of debt to GNP, as well as the government deficit (Table 4, Column 1) suggest that the effects of macroeconomic factors on Japan’s risk premium in the Meiji period were similar to those estimated by Edwards (1986) for the late twentieth century. Column 2 of Table 4 describes the relation between the risk premium and the information British investors had on Japan: The higher the fraction of *London Times* articles reporting on political instability and wars in Japan, the higher was the risk premium demanded by investors.

As for the composition of Japan’s sovereign debt, Column 3 of Table 4 indicates the existence of a negative relation between the ratio of foreign to total debt and the risk

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yields, albeit this effect was only marginally significant statistically.

<sup>22</sup> As explained in footnote 12, we choose not to use a formal test in the case of the Gold Standard itself, but instead divide the sample into the pre and post-Gold Standard periods.

premium.<sup>23</sup> Although there are many factors that could affect the choice between issuing debt at home and abroad, this finding clearly shows that when interest rates in London declined, the Japanese government borrowed more abroad and less domestically.<sup>24</sup> The fact that the Japanese government borrowed more at a lower cost implies that it responded rationally to changes (such as the Gold Standard) that lowered the cost of foreign capital.<sup>25</sup>

Figures 5a and 5b shed more light on the development of foreign and domestic borrowing. During the period of institutional reform, the Japanese government preferred to borrow at home and to liquidate much of its foreign debt. After the adoption of the Gold Standard, the government borrowed abroad and retired domestic debt. Prior to the adoption of the Gold Standard, the government financed the successful war with China from domestic sources. Following the adoption of the Gold Standard (and after the initial success in the war with Russia), the Japanese government was able to increase the volume of its foreign debt, and retire the domestic debt it assumed in preparation for the war. This analysis of “quantities” - the volume of debt - confirms that institutional reforms prior to the Gold Standard were not enough to enable the Japanese government to raise substantial amounts of capital abroad.

## V. Concluding remarks

Institutional reforms in developing countries are difficult to evaluate. This is why investors in the nineteenth century relied on credible “summary indicators” to evaluate the

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<sup>23</sup> The data on foreign debt probably include also yen-denominated bonds sold abroad.

<sup>24</sup> One possible reason for the Japanese government’s reluctance to issue debt abroad before 1897 could be the weakness of the yen (whose value declined with the world price of silver) relative to foreign currencies in the 1880s (Okazaki, 1997). The desirability of foreign debt could also be influenced by political considerations such as fear of foreign intervention in domestic affairs. In addition, the cost and availability of domestic debt are directly related to the decision to borrow abroad: Lockwood (1968) argues that domestic resources were no longer sufficient to finance Japan’s investment needs in the 1890s. Finally, Calomiris (1991) cites other factors that could affect the choice between domestic and foreign debt. The relative importance of these considerations is hard to evaluate. The market for government bonds in Tokyo during the Meiji period was “thin,” and not much information is available on domestic bond yields before the twentieth century.

<sup>25</sup> If, on the other hand, interest rates responded to “exogenous” changes in composition of Japanese debt, one

credit worthiness of far away Japan, namely the Gold Standard and the military victory over Russia. This suggests that institutional reforms are important for economic growth, but they only affects the cost of foreign capital when incorporated into a well-understood “indicator.” A similar pattern seems to exist today. Moody’s rating or agreements with the IMF have replaced the Gold Standard as symbols of sound economic policy and credit worthiness.

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would expect a positive relation between the risk premium and foreign borrowing.

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**Table 1 - Japanese bond issues in London**  
Source: Suzuki (1994)

<b>Year</b>	<b>Issue (pounds)</b>	<b>Interest Rate</b>	<b>Maturity (years)<sup>26</sup></b>	<b>Use of Proceeds</b>
<b>1870</b>	1,000,000	9%	13	railways
<b>1873</b>	2,400,000	7%	25	misc.
<b>1897</b>	4,390,000	5%	53	military
<b>1899</b>	10,000,000	4%	55	railways, telephone
<b>1902</b>	5,104,000	5%	55	military, telephone
<b>1904</b>	22,000,000*	6%	7	military
<b>1905</b>	60,000,000*	4.5%	25	military
<b>1905</b>	25,000,000	4%	25	misc.
<b>1907</b>	23,000,000	5%	40	misc.
<b>1910</b>	11,000,000	4%	60	misc.

\* denotes total proceeds raised in two separate issues of similar terms.

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<sup>26</sup> The Bank of Japan's historical figures on the maturity of some of the bond issues are slightly different.

**Table 2: Articles on Japan in the *London Times***

The table displays a classification of Japan-related articles in the *London Times* between 1871 and 1899. The classification is based on our own reading of the articles. Articles, which could not be classified into one of the four categories below (e.g. articles dealing with miscellaneous news on Japan or with Japanese culture), are excluded.

<b>Year</b>	<b>Internal instability and wars</b>	<b>Commerce and economics</b>	<b>Foreign relations</b>	<b>Institutions and reforms</b>
1871	3	5	2	1
1872	4	14	4	1
1873	5	8	6	3
1874	20	11	3	0
1875	1	6	6	3
1876	0	4	13	0
1877	23	3	2	0
1878	6	16	6	1
1879	4	14	2	5
1880	4	10	6	5
1881	1	3	5	0
1882	3	5	4	0
1883	0	4	3	0
1884	0	2	3	0
1885	0	2	3	2
1886	0	1	5	3
1887	2	2	9	3
1888	3	9	3	3
1889	15	12	10	9
1890	4	13	10	6
1891	7	5	3	2
1892	2	8	3	7
1893	1	4	1	1
1894	19	5	3	2
1895	18	9	12	0
1896	3	8	1	0
1897	1	10	11	1
1898	1	4	7	0
1899	0	5	6	1

**Table 3 - Tests for structural breaks around major historical events**

Using an eighteen month “window” around each event, we regress the natural logarithm of the risk premium (the yield differential between Japanese bond and British Consols yields), on a constant, the logarithm of the risk premium lagged one year, increments in the risk premium lagged one and two years, a time trend (if significant), and two dummy variables for each event. The first dummy variable (“long”) takes the value zero until the event, and the value one starting in the month in which the event took place and in every month thereafter, through the end of the “window”. The second dummy variable (“pulse”) takes the value one in the month of the event, and zero in all other months. If an event had a long-term impact on Japanese bond yields, we would expect the “long” dummy variable to be different from zero. A significant “pulse” dummy implies that an event created a short-term “blip”. Yields are calculated as the ratio of interest payment to market price. For the wars with China and with Russia, the “long” dummy variable takes the value one starting in the month in which the war ended, and the “pulse” dummy variable equals one when in the month in which the war broke. We report the coefficient of the event dummy variables, both long-term and temporary, if their impact is statistically significant. Coefficients should be interpreted as percent change in existing yields. \* denotes a coefficient which is significant at the five percent level.

Date	Event	Long-term break?	Short-term “blip”?
June 1873	Agrarian reform	-0.35*	None
Dec. 1877	Suppression of the Satsuma Rebellion	None	None
Nov. 1880	Privatization of government plants	None	None
Oct. 1882	Establishment of the Bank of Japan	None	None
June 1885	Introduction of convertible to silver yen notes	-0.05*	None
Feb. 1889	The Meiji Constitution	None	None
July 1890	First Parliamentary elections	None	None
July 1894	Outbreak of the China-Japan war	None	+0.10*
April 1895	End of the China-Japanese war	None	None
June 1897	Adoption of the Gold Standard <sup>27</sup>	-0.50	Not available
June 1902	British-Japanese treaty	-0.07*	None
Feb. 1904	Declaration of war on Russia <sup>28</sup>	None	+0.17*
Jan. 1905	Russian surrender in Lushon	-0.09*	None
Aug. 1910	Annexation of Korea	None	None
July 1912	Death of Emperor Meiji	None	None

<sup>27</sup> Because the entire stock of outstanding bonds was redeemed, we do not apply the test to this event. The estimated impact is based on the issue of new five percent bonds instead of the outstanding seven percent ones. Note also that June 1897 is the date in which the old bonds were replaced by the new (gold) bonds, but the legal process leading to the formal adoption of the Gold Standard ended in October 1897.

<sup>28</sup> The “window” around the war with Russia is two years long.

**Table 4 - Long-run co-integration results, 1871-1913****The risk premium and the volume of Japanese foreign debt, annual data**

The risk premium is defined as the annual average of the difference between Japanese bond yields and the yield on British Consols. The ratio of foreign debt to total debt, the government deficit, and GNP, available only starting in 1885, are adapted from the Bank of Japan's *Hundred Year Statistics of the Japanese Economy*. Newspaper articles are drawn from the *London Times* and defined as the percentage of articles dealing with political instability and wars out of the total number of Japan-related articles published in the same year. Standard errors are reported in parentheses.

	(1)	(2)	(3)
Variable	<b>Risk premium</b>	<b>Risk premium</b>	<b>Foreign debt/ total debt</b>
	(1885-1913)	(1871-1889)	(1871-1913)
Constant			-1.24
Debt/GNP	0.00015 (0.000016)		
Government deficit	0.00015 (0.000024)	0.0004 (0.0001)	
Newspaper articles on instability		0.004 (0.0008)	
Government Debt		0.0000001 (0.00000002)	
Interest rate differential			-36.71 (8.49)
N	26	27	37
Likelihood ratio	40.02	46.70	20.07
1% critical value	29.75	45.58	20.04