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**Using Markets to Measure Pre-War  
Threat Assessments: The Nordic  
Countries facing World War II**

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Bruno S. Frey

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# Using Markets to Measure Pre-War Threat Assessments: The Nordic Countries facing World War II\*

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## Abstract

Nordic historians have asserted for a long time that in the Nordic countries only few people, if any, perceived increased threats of war prior to the World War II outbreak. This would explain, and possibly excuse, why their governments did not mobilize their armies until it was too late. This paper questions this established notion by deriving new estimates of widely held war threat assessments from the fluctuations of sovereign market yields collected from all Nordic bond markets at this period. Our results show that the Nordic contemporaries indeed perceived significant war risk increases around the time of major war-related geopolitical events. While these findings hence question some, but not all, of the standard Nordic World War II historiography, they also demonstrate the value of analyzing historical market prices to reassess the often tacit views and opinions of large groups of people in the past.

**JEL classification:** C22, G14, N01, N44.

**Keywords:** Structural breaks, Sovereign debt, Capital markets, Historiography, Cliometrics, World War II.

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## 1 Introduction

In the conventional historical writing on World War II in the Nordic countries, historians have traditionally asserted that there were few, if any, Nordic people and, more importantly, political and military decision-makers who in 1939 and early 1940 recognized an increased threat of war to their own region. This historical finding is of significant importance as it helps to explain, and possibly also excuse, why the Nordic governments were so blatantly passive in mobilizing their armed forces on a large scale in the late 1930s and, consequently, largely unable to resist the attacks from the south and the east that came only a few months after the German invasion of Poland.<sup>1</sup>

But can we fully trust historians in their descriptions of people's pre-war threat assessments? After all, historians primarily rely on careful in-depth analyses of recorded source materials even though public opinions and threat assessments are never written down and kept for future generations. Furthermore, historians are influenced by people and sentiments in their own political and social context and if historians incorporate what they feel their readers wish to read into historical accounts this may produce biased results.<sup>2</sup> In other words, despite the great value that can be afforded to historical analyses there may be reason to question some of their evaluations of peoples' past assessments.

There are, however, other ways to find out how people were able to recognize pending war threats. This paper uses a method which links significant changes in government bond yields, which were quoted around the time of the outbreak of the war, to major geopolitical pre-war events.<sup>3</sup> The underlying idea is that wars put extraordinary pressures on countries' fiscal balances and may, in the worst case, provoke sovereign repudiations or defaults. This, in turn, increases the sovereign risk of these bonds implying that they are ex-

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<sup>1</sup> There is some variation to this picture, such as Finland mobilizing more than the others up to October 1939 but then actually demobilized during November (i.e., the weeks before the Soviet attack) and isolated intelligence reports on foreign troop movements reaching the Danish and Norwegian governments soon before the German invasion in April 1940. These issues are further discussed in section 2.

<sup>2</sup> Historians are themselves well aware of this problem. For example, Carr (1961) emphasized the interference of historian with the historical writing behind the historical writing has been well understood. There are many examples of the biased historical writing resulting from winners writing the history of wars. Bryld (2003, pp. 14–29), e.g., argues that the official Danish postwar account of the country's resistance movement during the war is a highly patriotic product in which historians have given in to contemporary pressures for a history of legitimization and national unification.

<sup>3</sup> The overlap between, on one hand, the general public and political and military decision makers and, on the other, the bond traders and investors is admittedly far from perfect. Still both the public and the market actors acted to a significant extent on publicly available information. Hence, one should expect their views and expectations about the future to be roughly identical. As for the political and military leaders, however, they partly possessed non-public information from the secret services, and to the extent that their views differed from those of the public this will be discussed.

pected to trade at lower prices and therefore higher yields on secondary markets.<sup>4</sup> In other words, significant changes in sovereign market yields reflect changes in people's pre-war threat assessments *in real time*.

This paper provides new evaluations of the popular pre-war threat assessments prevailing in the Nordic countries during the outbreak of World War II.<sup>5</sup> We use newly assembled sovereign yield data from the financial markets in Copenhagen, Oslo, Helsinki and Stockholm quoted during 1938–1940. From these yields, we then estimate unknown structural breaks<sup>6</sup> in the form of significant mean-shifts, using the method of Bai and Perron (1998, 2003). These breaks are selected endogenously from the time series properties of the yields, and can therefore be interpreted as the contemporaneously updated risk assessments of the actors in these historical financial markets. If they, furthermore, coincided with important pre-war political or military event this strongly suggests that the sovereign yield changes were in fact driven by changes in the widely perceived war threat.

The second part of our analysis contrasts these market-based estimates with the corresponding evaluations of Nordic historians. We do this by first considering a large number of writings by well-known and reputed Nordic World War II historians, from which we derive a fair, but of course not perfect, representation of the “conventional” historical view. Then we classify the resulting perceived threat levels, for each Nordic country, during different time periods and, finally, contrast these threat levels with the findings of our own empirical analysis. While being far from complete, the comparison of these two versions of history sheds light on two important questions. First, is the conventional historiography robust to an alternative assessment of the same historical phenomena? Second, if differences arise, are they consistent with the postwar historical war accounts, according to which the political leaders during the war could not have been expected to have more information since nobody is able to predict the impending events in the future?

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<sup>4</sup> Naturally, this also requires minor changes in other standard bond yield determinants, such as the coupon rate, the time to maturity, tax status of cash flows, redemption clauses and the discount rate. Although these were mostly constant, we estimated the breaks using yield spreads (subtracting the Swedish yields) and hence canceling out market-specific determinants. These estimations produced essentially the same results and are available from the authors upon request.

<sup>5</sup> Note that the fifth Nordic country, Iceland, is left out because of a lack of Icelandic government bond data.

<sup>6</sup> The term “unknown” refers to the fact that no prior information about the existence or timing of the breaks is imposed before the estimations. By “letting the data speak” we therefore ensure that we do not merely capture our own preconceptions but rather the forward-looking views of the contemporaries. For a general overview of the large literature on structural break estimations, see Perron (2006).

<sup>8</sup> For example, Bryld (2001) describes the Danish historiography of World War II as a “history of legitimization” (p. 14). He states further: “The official history of the occupation was made up in 1945, a story of political and pragmatic art which satisfied the needs for political unity and ethical consistency of the elites [...] and the majority of the population. [...] The main element of this story telling was patriotism.” (p. 29). In the case of Norway, Skodvin (1991, pp. 309f) describes that there were many postwar forces interested in influencing the war history so that “their own people” came out as favorable as possible in the descriptions.

There is a growing literature that uses financial market data to analyze the effects of political and institutional changes. In the groundbreaking analysis of Willard et al. (1996), events taking place during the U.S. civil war are analyzed based on their impact on the market for "greenbacks", a special currency issued by the Union. Following their approach, Frey and Kucher (2000, 2001) analyze how the events before and during World War II affected domestic and foreign government bond prices at the Zurich stock exchange. They find that these events consistently reflect many of the historically important events, such as the annexation of Austria by the Germans, the outbreak of the war, the German defeat at Stalingrad and the Yalta conference. Similar analyses of bond prices during World War II have been undertaken by Oosterlinck (2003) on France, Brown and Burdekin (2002) on German bonds traded in Britain, and by Frey and Waldenström (2004) on Belgian and German bonds traded simultaneously in Switzerland and Sweden. While all these studies are close in spirit to ours, none of them make the same explicit analysis of widely held pre-war threat assessments, nor do they compare those with the corresponding estimates of conventional historiography. Focusing on more contemporary war experiences and the forward-looking elements of financial markets, Rigobon and Sack (2005) find a considerable war risk premium in the returns of several common financial assets during the build-up before the U.S. war in Iraq 2003. With a similar focus, Wolfers and Zitzewitz (2005) find that the war probabilities during the same pre-Iraq war period derived from prices at so-called prediction markets, which are electronic venues trading securities with payoffs contingent on specific political or economic outcomes, were highly consistent with the flow of war-related news and events.

## **2 Nordic historiography on pre-World War II threats and its problems**

This section presents a selection of writings by well-known Nordic historians on how Nordic people perceived the pre-war threat during 1938–1940. Before this, however, we briefly point out some of the potentially severe methodological problems that these descriptions are associated with.

When historians describe public sentiments in history, they face some important methodological problems. First, public opinion almost always is tacit and hence not documented in written form, which makes it in principle unobservable to historians who primarily rely on written source materials. The second, and perhaps more important, problem is that historians may be highly influenced by their own postwar political and social context when selecting and interpreting the historical facts at hand. This risk of having a sample selection bias is particularly prevalent for war or military historians, since wars are often politicized afterwards by postwar politicians and public opinions. Naturally, historians are well aware

of these problems (see, e.g., Carr, 1961 or Marwick, 1970) but all the same they seem to prevail in the context of the Scandinavian official World War II historiography.<sup>8</sup>

Our outline of the “conventional” Nordic historical writing below consists of citations and references from texts by fifteen well-known and reputed Danish, Finnish, Norwegian and Swedish historians specializing in World War II.<sup>9</sup> The choice to only read the works of Nordic historians exclusively came about because we believe them to be best suited to capture assessments of the public, but also because they correspond closest to the Nordic market actors whose assessments are estimated from market prices.<sup>10</sup>

*Denmark:* Historians agree that the Danes felt quite safe from being involved in any of the war activities taking place on the European continent and that the German invasion of Denmark on April 9, 1940, came as a total surprise. However, the Danes were well aware of their geographical proximity to Germany and when they, as the only Scandinavian country, signed a non-aggression pact with Germany in mid-1939 this was regarded as “ensuring peace and stability” (Nissen, 1988, p. 353f). There is surprisingly little said about the reactions to the outbreak of war in Poland and Finland. There seems to have been some increased level of uncertainty after the Danish Prime Minister’s New Year’s speech in January 1940, in which he stated that Denmark would hardly be able to resist a foreign invasion, if it were to come about. People were infuriated by this defeatism, but according to Wendt (1966, pp. 41f) “All their worries disappeared entirely” when all parties in Parliament immediately thereafter openly declared that Danish neutrality stood firm. One historian, Lidegaard (2005, p. 152), claims that Danish politicians were confident about their policy of passiveness and that it would minimize the risk of war: “the less Denmark did to attract [Hitler’s] attention the better”. Finally, when the German invasion came, Gram (1986, p. 15) asserts that it came as a surprise: “With the greater part of Norwegian and Danish political and public concerns focused on the British laying of mines, the German strategic plan for a command of Norway – and the occupation of Denmark it would require – achieved in creating a complete surprise.”

*Finland:* Most Finnish historians describe the Soviet Union as being perceived as a latent threat by the Finns in the 1930’s. There was even open mutual distrust between the two countries’ politicians (Zetterberg, 1991, p. 56). Yet Jakobson (1961, p. 99) writes that “there was no sense of immediate danger in Finland during the beautiful late summer of

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<sup>9</sup> It should be noted, however, that behind these fifteen researchers are a scanning of the works of at least twice as many Nordic historians but whose writings say nothing about the public sentiments at this time. One comprehensive listing of the Nordic World War II literature is Nøkleby (200X).

<sup>10</sup> Although the Finnish historian Max Jakobson, lacks a formal academic background, his works are widely cited and used by professional historians in all Nordic countries.

August and September 1939". Interestingly, the views from the Swedish horizon were more pessimistic: "The German-Russo pact [publicly announced on August 23] placed Finland in an awkward position: Everybody could see that it offered Russia its best chance to re-conquer Finland since 1920" (Thulstrup, 1950, p. 8). Later on, however, also the Finns perceived an increased Soviet threat. Jakobson (1961, p. 139) writes that although Foreign Minister Paasikivi in mid-November believed that Stalin would leave Finland in peace, "The majority, however, held a different view of Stalin's intentions". Finally, it is not clear if the Finns really anticipated the Soviet attack which eventually came on November 30 or if they did not. On the one hand, Finland was fully mobilized already in early October but, on the other hand, the government started to send troops home from the front from mid-November onwards. Perhaps this is explained by the evidence found after the war which says that in late November "most diplomatic observers" in Finland and in Moscow thought that "the Soviet Union would not try to enforce its claims on Finland or Romania by force of arms" (Jakobson, 1961, p. 142).

*Norway:* Historians agree that of all Northerners the Norwegians felt the most safe from becoming involved in a war on the European continent. The German invasion in April 1940, therefore, is described as a complete surprise. As in the Danish case, very little is said about the public's reaction to the wars on the continent and in Finland. Not even the *Altmark* incident on February 16, 1940 is described as having affected the Norwegians. During this incident, British troops boarded a German destroyer in Norwegian waters. This launched a fierce German protest against Norway which resulted in a sharp Norwegian protest against Britain (Skodvin, 1991, pp. 38f). The German invasion, finally, came as a surprise. Bull (1979, pp. 342f) states that its "surprise tactics was a success" and that many citizens of Oslo, "woken up in the night by the sirens warning for an airborne attack were annoyed since they believed it to be just another practice exercise". Furthermore, Jensen (1965, p. 113) writes: "On the basis of what everyone knew [at the time], the situation was so serious that it now seems unimaginable that we did not react any differently than we did. It only shows how deeply rooted the belief had generally become among the Norwegians, that we could manage to keep out of the conflict. The parliament and government were representatives of a view that was general."

*Sweden:* As for the Swedes, most, but not all, historians describe that they felt quite sure of remaining outside the war. Åberg (1992, p. 522) states that "In the beginning of the war, none of the governments in Sweden, Norway and Denmark seems to have worried about a German attack on Scandinavia". Carlgren (1989, p. 150) asserts that "there is a striking contrast between the confidence shown [after the outbreak of World War II] and the widespread popular worries that followed the outbreak of World War I". One Swedish histo-



rian, Johansson (1982, p. 138), offers a somewhat different picture, arguing that the Finnish war made the Swedes more aware of the external military threats: “When the world war broke out the Nordic countries did not seem threatened. Many people regarded the Pact in Moscow as assuring peace to the Baltic region. [...] The war between Finland and the Soviet Union, however, was a severe blow that stunned Sweden.” He continues: “There was a general agreement among the overwhelming majority of the population that Sweden must use each day still in peace to arm its military defense. The dominating sentiment was that Sweden was given a respite under the gallows which had to be exploited” (Johansson, 1982, p. 139). Sweden nevertheless demobilized its already limited number of military forces on a broad frontier after Germany’s invasion of Denmark and Norway, which according to Norborg (1981, pp. 249ff) signifies a firm belief that Sweden would not be drawn into the war activities.<sup>11</sup> On balance, it is fair to say that historians would describe the Swedish threat assessments as practically nonexistent during most of this period, perhaps with exception for the time of the Finnish-Soviet war (November 30, 1939 – March 12, 1940).

### **3 Data series and institutional setting**

The main data used are secondary yields to maturity of Nordic government bonds, calculated from bid prices quoted on the markets in Copenhagen, Helsinki, Oslo and Stockholm between January 1938 and December 1940. Table 1 lists detailed information on the individual bond loans analyzed and their sources. As can be noted from the table, there are domestic bond yields from all markets but foreign yields for the non-Swedish bonds available from the Stockholm market, where both domestic and foreign securities were listed and traded. There are some variations in the data coverage in the different markets, which are due to both insufficient reporting and institutional specificities. For example, the Helsinki Stock Exchange stopped all bond trading from October 11, 1939 to the end of the war and we could not find prices prior to August 1939 for Oslo.

The institutions governing the trading and pricing at these bond markets were, for most of the period studied, fairly well functioning. There are some indications of non-market influences such as central bankled interventions and various forms of circuit breakers (e.g., trading halts and price controls). Although lending governments always wish to keep down the interest rates on their own debt instruments, the available evidence from the

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<sup>11</sup> Two much more imminent threats of war to Sweden, according to Norborg (1981, p. 255) and Johansson (2002), were the “Midsummer Crisis” in June 1941, when the Swedish government considered refusing the Germans to ship troops across Swedish territory, and the “February Crisis” in February 1942 when the Swedes sent large numbers of troops to the Norwegian border in order to meet an expected German invasion based on cracked German secret messages.

Danish and Stockholm market suggests that these initiatives were both relatively few and probably had a limited long-run effect. Concerning our analysis of sovereign yield changes, moreover, we focus on *very large* and statistically significant lasting shifts that would be very expensive for one single actor to prevent from occurring. Among the circuit breakers recorded, there were price controls in Copenhagen (strict price controls were introduced in September 1939 and maintained during the entire war) and Stockholm (mild price controls were only used from September-December 1939) and a bond market closure in Helsinki from October 11, 1939 onwards. But in the cases of Copenhagen and Stockholm, the impact on quoted asset prices, in particular over the longer run, was quite limited (Waldenström, 2005). The cross-border capital flows halted from September 1939 onwards, which implies that there were no extensive buybacks by the lending governments after that point in time. We do not know the identity of the market actors, which would be of particular interest to a study like ours.<sup>12</sup> However, we know that thousands of Nordic households were holding government bonds (about 6% of the entire stock in Sweden in 1940) but that the most important investors, and most likely also traders on the financial markets, were large Nordic financial institutions.

There are also some problems with the data. Some values are missing in the Finnish and Norwegian bond yields recorded at the Stockholm market.<sup>13</sup> Missing values could be a sign of insufficient reporting or publishing of prices, but it could also signal more severe problems such as low trading volumes. We consequently use bid prices instead of sell prices, which caps the risk of having rigged prices. Moreover, based on a sample of daily volumes of the individual foreign loans traded at the Stockholm Stock Exchange and an estimate of the aggregate OTC bond trading, there seem to have been active and continuous trading on the Stockholm foreign bond market during the whole study period.<sup>14</sup> Since the econometric method requires the series to be continuous they are linearly interpolated over the gaps. This has little effect on the data except in for Norwegian yields in Stockholm right after the German invasion in April 1940 (during April-September that year we only have bid price observations in six of 25 weeks).

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<sup>12</sup> If all traders acted rationally, however, their identity actually does not matter since they all capitalize on the same publicly available information.

<sup>13</sup> Specifically, there are missing values in the Finnish yields in December 1939 and April-May 1940 and in the Norwegian yields in April-June 1940.

<sup>14</sup> We collected a small sample of trading volumes from the Stockholm Stock Exchange for all days during March, June, September and December in 1938 and 1940 for the four Nordic government bonds. The result shows that trading was relatively large in all bonds at all times except the Norwegian bonds after April 1940. Moreover, Waldenström (2006) estimates the size of the interwar and wartime Stockholm OTC market, i.e., the traditionally most important secondary bond market, finding similar evidence of sufficient trading volumes for most periods and countries' bond loans.

## 4 Empirical methodology

In order to link shifts in quoted sovereign yields with changes in people’s threat perceptions, we employ a recent econometric methodology developed by Bai and Perron (1998, 2003) to estimate unknown multiple structural breaks in univariate time series. There are many advantages to using this particular method. For example, it does not rest on any prior information about the existence and timing of the structural changes. Instead it simply “lets the data speak”, which has been shown to be a crucial consistency feature (see Perron 2006). Moreover, the method is among the few able to consistently estimate a large, unspecified number of breaks, and also to calculate their size and confidence intervals while allowing for a considerable variation in distributions of the error terms, both within and across segments.

We estimate the breaks by fitting the following system of linear regressions:

$$y_t = c_j + \varepsilon_t, \quad t = T_{j-1}+1, \dots, T_j. \quad (1)$$

where subscript  $j$  ( $j = 1, \dots, m+1$ ) denotes the time series segments that are separated by the  $m$  structural breaks,  $y_t$  the nominal sovereign yield of each country at time  $t$  expressed in basis points,  $c_j$  is the estimated intercept (average yield) for each segment and  $\varepsilon_t$  a white noise error term.<sup>15</sup> The method tests for the existence of breaks using two types of Wald tests. If they indicate that breaks exist, the method estimates their exact number using a sequential strategy which halts when no more significant breaks are found.<sup>16</sup> An important parameter to set before the undertaken estimations is the smallest allowed length of the segments in order for breaks to be called “structural”. We follow the standard procedures and require breaks to be at least ten percent of the total sequence length, which means that our segments will be at least 20 days or weeks depending on which yield series is used.<sup>17</sup>

Our motivation for using a relatively simplistic model as in equation (1) is that this mean model produces intuitive and easily interpreted estimates of the structural breaks; the break size,  $\hat{c}_j - \hat{c}_{j-1}$ , is the number of basis points with which the yields increase or decrease. One issue that arises is that most high-frequency financial variables, including the bond yields used here, exhibit high degrees of persistency which are not fully accounted

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<sup>15</sup> We follow the convention of using  $T_0 = 1$  and  $T_{m+1} = T$  (total length of sequence).

<sup>16</sup> For details of the method’s inferential setup, we refer the reader to the papers by Bai and Perron (1998, 2003). All estimations use the GAUSS program available from Pierre Perron’s web page.

<sup>17</sup> This corresponds to the series lengths listed in Table 1. Technically, we choose *trimming parameter*  $\pi$  to be 0.10 (10 percent). Bai and Perron (2005) recommend having at least 18 observations in each segment for the calculation of variance-covariance matrices. For robustness purposes, we also used both shorter (0.05) and longer (0.15) trimming parameters but found no important differences in the basic findings.

for. The robustness of the Bai and Perron methodology with its apparatus for dealing with a wide range of error distributions, however, alleviates most such modeling concerns. Moreover, simulations by Paye and Timmerman (2003) suggest that persistency has limited effect on the ability of Bai and Perron's method to consistently pick the correct break points. Nevertheless, to make sure our model choice does not interfere with the results we have run parallel break searches using a yield model with a lagged dependent variable,  $y_t = c_j + \beta y_{t-1} + \varepsilon_t$ . The results are basically the same as in the mean model except that the autoregression term dampens the estimated break size and dates the breaks one or two months earlier.<sup>18</sup> The remarkable consistency in the dating of breaks across the models comes from the large magnitudes of most breaks corresponding to the extreme political wartime shocks. In fact, Bai and Perron (2003) emphasize that large break magnitudes is a crucial prerequisite for having robust break estimates.

Another modeling issue of importance is that nominal sovereign yields also pick up influences from other factors than the default risk, especially from macroeconomic fluctuations such as inflation or market interest rates. To check that this does not interfere with our results, we replace the yields in equation (1) with yield *spreads* for that part of our dataset (the Stockholm data) that includes sovereign yields from all Nordic countries. The yield spreads for the three non-Swedish countries, defined as their yields less the Swedish yield, should cancel out most common macroeconomic influences. The results are basically identical with the main results of the paper, which again indicates a satisfactory robustness of our method and findings.

Finally, how should one interpret the structural break sizes in terms of the magnitude of a changed war threat? This question concerns the expected impact of a war on a country's sovereign yields, and there are no clear-cut answers in either asset pricing theory or financial history on this issue. In principle, all borrowing countries balance the costs of a default (reputational losses that most likely result in more expensive future borrowing) with its benefits (retained cash that is not paid out to lenders), and war may in various ways change both the costs and benefits in complex ways depending on several factors such as the fiscal status of the country, the extent and length of the war, or the design of the existing debt contracts (e.g., gold clauses). Looking at history, there are several examples during the 19th and 20th centuries of belligerent countries that in some way defaulted on their debt, although the opposite, i.e., countries at war sustaining the servicing of its debt, was more common.<sup>19</sup> Hence, interwar sovereign debt markets cannot have been excessively worried of debt defaults even if a war were to break out. In terms of our study, we should

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<sup>18</sup> These estimates are available upon request.

<sup>19</sup> See Suter (1992, pp. 61–83).

hence expect increased threats of war to be associated with higher, but not infinite, yields. Additional evidence on the robustness of interwar bond investors is the remarkable cases of government bonds issued by countries that formally had ceased to exist, e.g., Tsarist Russia after 1917 or Austria after 1938, that kept on being traded and quoted at almost normal yield levels for years.<sup>20</sup>

## 5 Results and comparative analysis

### 5.1 Structural breaks in the Nordic sovereign yields

Table 2 shows the estimated structural breaks in the Nordic sovereign yields during 1938–1940.<sup>21</sup> Consider first the Danish government bonds at home and in other northern countries. The Danish yields in Copenhagen (Figures 1 and 2) exhibit several major positive breaks at the time of some major war events, which signals clearly increasing threat perceptions well before the German invasion in April 1940. The first two breaks, amounted to combined 120 basic bond yield points, occurred around the time of the outbreak of World War II and the third occurred in mid February 1940 during the *Altmark* incident off the Norwegian coast (discussed above). Looking at the Danish yields in Stockholm (Figure 3), we see similar, but even stronger indications of increased war threats in 1939. There is a very small, and seemingly politically insignificant break in late 1938, but then there is a notable break in late March 1939, shortly after the German annexation of Czechoslovakia. A third break occurred in late August 1939, simultaneously with the first Copenhagen break. The fourth break is recorded in early December 1939, which was just after the Soviet attack on Finland which increased the Danish yields by 215 basis points. Finally, the German invasion of Denmark on April 9, 1940, which had been recorded in Stockholm since Sweden was still neutral and at peace, produced a significant break of +361 basis points, but the initial spike during the first week after the invasion amounted to +1,900 basis points! Hence, these results show that the traders in Denmark and Sweden perceived a clearly increased war threat on Denmark well ahead of the German invasion. The invasion spike in the Stockholm yields, reflecting the yield under realization of war, however, suggests that the Swedish investors still believed that a continued peace was more likely than the outbreak of war in Denmark.<sup>22</sup>

<sup>20</sup> Oosterlinck and Landon-Lane (2006) show that Tsarist Russian bonds kept being traded in Paris in 1918–1919 on yields averaging at no more than 8 percent! Similarly, Austrian bonds traded in Zurich throughout World War II at about a 15 percent yield (Frey and Kucher, 2000).

<sup>21</sup> There are additional results from the estimations that do not appear in the table, including the  $\text{Sup}F_T(\ell|0)$ - and  $\max_{1 \leq \ell \leq L} \text{Sup}F_T(\ell|0)$ -tests for existence as well as the sequential  $\text{Sup}F_T(\ell+1|\ell)$ -test for the number of breaks. These are available upon request.

<sup>22</sup> An “assessed war probability”, calculated as the Stockholm yields right before the war divided by the tip of the yield spike right after the war outbreak, for Denmark is 40% (750 bp / 1,150 bp = 0.395).

Consider now the Finnish government bonds at home and abroad. The Finnish yields in Helsinki (Figure 4) exhibit two very small, and unimportant, breaks recorded during February-March 1939. By contrast, a third break on September 6, of +62 basis points suggests that the outbreak of war on the continent was clearly perceived as affecting Finland in a negative way. Since the Helsinki Stock Exchange closed down all bond trading on October 11, we cannot tell from the yields how the Finns reacted to the continued development although the closure of the stock exchange by itself indicates increasing fears of a substantially increased political turbulence. The Finnish yields in Stockholm (Figure 5) contain three structural breaks, the first one in early September 1939, i.e., at the same time as in Helsinki but much larger, of +862 basis points. The second break was in early December, i.e., after the Soviet attack on Finland, which increased the yields by an additional 2,083 basis points! The third break occurred in mid-March 1940, immediately after the Soviet-Finnish truce, and interestingly it was by  $-1,298$  basis points. In other words, while both Finns and Swedes interpreted the German-Russo anti-aggression pact and the outbreak of war in Poland as strongly increased external threats to Finland, the actual outbreak of war in Finland further increased the sovereign risk (in Sweden).

Consider, thirdly, the Norwegian government bonds. The Norwegian yields in Oslo (Figure 6) experienced five structural breaks. Of these, the first four in early September, mid-October, early December 1939, and one in late January 1940 were significant increases of 132 basis points in total. While the September and December breaks are clearly associated with war events in Poland and Finland, the other two are less obviously related with the war developments. The last break occurred in mid-March 1940, directly in relation to the announced truce in Finland and, interestingly, it was a yield cut by 55 basis points indicating a lowered perceived threat after this peace event. As for the Norwegian yields in Stockholm (Figure 7), they portray a much more homogenous picture. The first break in early September 1939 was a 201 basis points increase and the second +176 basis point break in late December clearly indicate increased war threats to Norway, as perceived by traders in Sweden. Then there was a third break recorded just after the German invasion, in April 1940, measuring +333 basis points and hence indicating that the eventuality of war was not entirely capitalized by the Swedish market actors. Later in 1940 there is a fourth break of  $-243$  basis points, which most likely signals the resolved uncertainty about the effects of the German occupation on Norway's economy and, perhaps, even status as a sovereign nation.

Finally, consider the Swedish government bonds. The Swedish yields recorded in Stockholm (Figure 8) experienced five structural breaks between 1938 and 1940. Three of these were significant yield increases occurring right at the time of several major war events: the

outbreak of the war in early September 1939 (+66 basis points), the Finnish-Soviet war in December 1939 (+44 basis points) and the German invasion of Denmark and Norway in early April 1940 (+15 basis points). An interesting observation is that the yield increases get smaller the closer the war gets to Scandinavia. This could signal that Swedes regarded the risk of an attack on Sweden as being independent of the risk of attacks on the other Nordic countries. Given the vast importance of the Swedish iron ore exports to, in particular, the German war industry such a conjecture may actually have been plausible at the time.

A general finding of these estimations is the interesting distribution of responses to the events across geographical borders. While foreign and domestic traders react almost identically in time to the same major political events, the magnitude of their reactions in terms of basis point changes differ by a factor of between five and fifteen. The Molotov-Ribbentrop Pact, for example, boosted the Danish government yields by 51 basis points in Copenhagen but by 136 basis points in Stockholm. Similarly, the Soviet invasion of Finland raised Norwegian sovereign yields by 48 basis points in Oslo but 176 basis points in Stockholm. The reasons for this heterogeneity has been studied by Waldenström (2006), who looks at the specific case of the Danish sovereign debt traded in Copenhagen and Stockholm in the late 1930s and the entire 1940s. The single most important explanation for this discrepancy is that governments tend to discriminate against foreign investors vis-à-vis their domestic counterparts and that this is mainly driven by political power concerns.<sup>23</sup>

## 5.2 Comparing the views of historians and markets

This section compares the estimates of historians and markets about the widely perceived war threats in the Nordic countries in 1938–1940. Since neither approach is free from methodological and data-related problems this exercise is not about any version being “right” or “wrong” or “better” or “worse”. Rather, we wish to shed light on whether they differ at all and, if so, why and in what way. Table 3 uses the findings from previous sections to classify the level of assessed threats for each Nordic country in different time periods. A first result is that there is agreement on that Nordic people perceived little external threat before late August 1939. Although the Danish yields rose in March of that year, the substantial yield increases came right after the Molotov-Ribbentrop pact or the German attack on Poland one week later. This also suggests that the Nordic people did not compare themselves to Austria and Czechoslovakia in terms of foreign policy relations

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<sup>23</sup> Competing hypotheses rejected by Waldenström (2006) are local government (or central bank) interference in bond market to keep yields low, institutional differences in market regulations and microstructure, and different degrees of risk aversion across the national markets.

with “big neighbor” Germany, at least judging from the lack of major threat increases recorded after their annexations in 1938 and 1939, respectively.

The most significant result from the comparison is the discrepancy in perceived threats between the two versions. In short, the financial markets signal substantially higher war risk expectations than historians do. For example, whereas historians report that the Danes and Norwegians felt largely secure up to the German invasion, the markets display several dramatic yield increases following some of the most important war-related events: the German-Russo Pact, the outbreak of World War II, the war between Finland and the Soviet Union as well as some minor events in early 1940. In the case of the Finns, both the Finnish and Swedish financial markets reflect significant war threats after the German-Russo Pact and the outbreak of war, whereas historians suggest there were none. Interestingly, not even the Finnish political and military leaders, who were arguably better informed than the Finnish people, perceived a larger war threat more in line with the bond markets before the Soviet attack. In fact, our historical outline in section 2 showed that while the Finnish people in October 1939 started feeling seriously uneasy with the Soviet intentions after having observed the Soviet annexations of the Baltic states, the Finnish government continued to put their trust into the benevolence of Stalin and even withdrew troops from the front in late November.

There are, however, several points of agreement between the historians and the markets. One such instance is the fact that the Norwegian yields in Oslo actually decreased after the announcement of the Moscow truce in March 1940, which hence was interpreted as lowering the risk of war on Norwegian soil. It should be noted, however, that the Swedes did not seem to have reached the same conclusions as the Norwegian yields in Stockholm stayed at their relatively high pre-invasion level through March. Another example of concurrence is the fact that the realization of war in Finland, Denmark and Norway gave rise to yield spikes in the respective countries’ bonds traded in Stockholm. If anything, this indicates that there was no one who fully anticipated the wars, which hence supports the claims of historians. Judging from the magnitudes of the estimated breaks relative the short-term spikes, which reflect the prospected yield under the realization of war, the market actors viewed the probability of war in Denmark, Finland and Norway as being somewhere around 50 percent.<sup>24</sup>

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<sup>24</sup> The “assessed war probabilities”, calculated as the pre-war yields divided by the tip of the yield spike right after the war outbreak, are for Denmark 40% (recall the previous section), for Finland 35% ( $1,100 \text{ bp} / 3,200 \text{ bp} = 0.344$ ) and for Norway 54% ( $700 \text{ bp} / 1,300 \text{ bp} = 0.538$ ).



## 6 Concluding remarks

Nordic historians have asserted for a long time that in the Nordic countries only few people, if any, experienced increased war threats against their own countries in the late 1930s and early 1940, i.e., just before three of them were in fact attacked by enemy powers. This historical result, in turn, has played an important part in explaining, and also excusing, why the Nordic governments refrained from mobilizing their armies until it was too late. This paper contrasts this established notion by using a different method to analyze the widely held war threat assessments. Our method focuses on changes in Nordic government bond yields during 1938–1940 and the fact that changes in these yields that coincide with important war events reflect changes in war risks assessed in *real time* by the contemporaries.

Our main finding is that there are several large points of disagreement between the two interpretations of history. While historians in general state that the Nordic peoples felt safe from being attacked until the autumn of 1939 (Finland), the winter of 1939 (Sweden) or early April, 1940 (Denmark and Norway), the government bond prices of these countries fell considerably, or sovereign yields increased significantly, several months before these conjectured dates. The yield changes were mostly direct responses to major war-related political events such as the announcement of the Molotov-Ribbentrop in late August 1939 or the Soviet attack on Finland in late November of the same year which boosted the sovereign yields of all Nordic countries.

There are, however, also some points of agreement between the two interpretations of history. For example, Norwegian yields traded in Oslo, decreased significantly after the Moscow truce between Finland and the Soviet Union. Moreover, all Nordic yields traded in Stockholm spiked after the outbreak of war (Finland in December 1939, Denmark and Norway in April 1940). Both these cases suggest that market traders did not fully believe in a war coming, which offers some support to the general assessment of historians.

What then could explain the observed discrepancies between the historical writing and the market-based assessments? We have already pointed at well-known methodological problems with the historical analysis that could be one part of the explanation. These problems concern the focus on text-based sources in the historical research. Another important source of bias may be that historians may partly respond to pressures from their own political and social contexts, which is reflected in their war historiographies. Naturally, part of the discrepancy may also be due to skewed selection of the available historical writing. There is an enormous literature on World War II and to adequately reconcile a balanced account of it is difficult. We are also well aware that the financial market-based analysis is

not without its own problems, as has been discussed above. For example, the data quality is questionable in some instances and the econometric method used rests on specific modeling choices.

Altogether, the work of historians is without any doubt crucial and indispensable to understand the views and threat perceptions of the prime actors in history. We argue that econometrically analyzing reactions on financial markets presents a useful complement to traditional historiography. This paper uses historical government bond yields to derive the perceived threats of war. This analysis suggests robust changes in risk assessments correlated in time with the most important geopolitical events leading up to the war, thereby questioning some, but not all, of the conventional Nordic World War II historiography.

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**Table 1: Nordic government bond loans analyzed in the study.**

Bond loan, period, coupon	Freq.	T	Ave.	CV	Trading period	Source
<i>Stockholm market:</i>						
Danish gov., 1936–56, 4%	Weekly	157	0.055	0.621	1/4/38–12/31/40	<i>Affärsvärlden</i>
Finnish gov., 1934–44, 5%	Weekly	157	0.116	0.883	1/4/38–12/31/40	<i>Affärsvärlden</i>
Norwegian gov., 1934–59, 4%	Weekly	157	0.058	0.591	1/4/38–12/31/40	<i>Affärsvärlden</i>
Swedish gov., consol, 3%	Weekly	157	0.033	0.150	1/4/38–12/31/40	<i>Affärsvärlden</i>
<i>Copenhagen market:</i>						
Danish gov., 1934–59, 4%	Weekly	78	0.0546	0.112	10/1/38–4/5/40	<i>Finanstidende</i>
Danish gov., 1934–59, 4%	Daily	189	0.0493	0.139	7/3/39–4/8/40	<i>Berglinske Tidende</i>
<i>Oslo market:</i>						
Norwegian gov., 1937–68, 4.5%	Daily	212	0.051	0.084	8/2/39–4/8/40	<i>Morgenbladet, Aftenposten</i>
<i>Helsinki market:</i>						
Finnish gov., 1935–60, 5%	Daily	238	0.051	0.043	1/3/39–10/10/39	<i>Hufvudstads- bladet</i>

Note: “Freq.” denotes trading frequency, “T” is the number of observations, “Ave.” is the average mean level of the series used and “CV” is the coefficient of variation (standard deviation divided by the average).

**Table 2: Structural breaks in Nordic sovereign yields, 1938–1940.**

Country, Break No.	Break date	Confidence interval (periods)	Break size (basis points)	Contemporaneous war event
Denmark	<i>Copenhagen market, Daily series, 7/3/1939–4/8/1940 (T = 189)</i>			
1	8/25/1939	[-2, +1]	+51	German-Soviet anti-aggression pact
2	9/26/1939	[-4, +1]	+71	Outbreak of World War II
3	2/14/1940	[-1, +6]	+54	<i>Altmark</i> incident in Norway (?)
	<i>Copenhagen market, Weekly series, 10/1/1938–4/5/1940 (T = 78)</i>			
1	9/22/1939	[-1, +1]	+120	Outbreak of World War II
2	2/16/1940	[-1, +2]	+54	<i>Altmark</i> incident in Norway (?)
	<i>Stockholm market, Weekly series, 1/4/1938–12/31/1940 (T = 157)</i>			
1	12/13/1938	[-6, +6]	+13	
2	3/28/1939	[-19, +1]	+40	Germany annexes Czechoslovakia
3	8/22/1939	[-6, +2]	+136	German-Soviet anti-aggression pact
4	12/5/1939	[-2, +3]	+215	Soviet Union attacks Finland
5	4/9/1940	[-38, +1]	+361	Germany invades Denmark
Finland	<i>Helsinki market, Daily series, 1/3/1939–10/10/1939 (T = 238)</i>			
1	2/2/1939	[-4, +1]	-5	
2	3/30/1939	[-27, +1]	+6	
3	9/6/1939	[-1, +1]	+62	Outbreak of World War II
	<i>Stockholm market, Weekly series, 1/4/1938–12/31/1940 (T = 157)</i>			
1	9/5/1939	[-6, +6]	+864	Outbreak of World War II
2	12/9/1939	[-19, +1]	+2,083	Soviet Union attacks Finland
3	4/2/1940	[-6, +2]	-1,298	Finnish-Soviet peace treaty
Norway	<i>Oslo market, Daily series, 8/2/1939–4/8/1940 (T = 212)</i>			
1	9/8/1939	[-3, 0]	+38	Outbreak of World War II
2	10/16/1939	[-2, +13]	+17	
3	12/11/1939	[-1, +1]	+48	Soviet Union attacks Finland
4	1/29/1939	[-1, +3]	+29	
5	3/13/1939	[-1, +1]	-55	Outbreak of World War II
	<i>Stockholm market, Weekly series, 1/4/1938–12/31/1940 (T = 157)</i>			
1	9/5/1939	[-1, +2]	+201	Outbreak of World War II
2	12/26/1939	[-1, +1]	+176	Soviet Union attacks Finland
3	4/30/1940	[-1, +1]	+333	Germany invades Norway
4	9/10/1940	[-1, +2]	-243	Norwegian resistance ends (Aug.)
Sweden	<i>Stockholm market, Weekly series, 1/4/1938–12/31/1940 (T = 157)</i>			
1	4/18/1939	[-26, +1]	+8	
2	9/12/1939	[-2, +1]	+60	Outbreak of World War II
3	12/26/1939	[-1, +3]	+44	Soviet Union attacks Finland
4	4/9/1940	[-15, +3]	+15	Germany attacks Denmark/Norway
5	7/30/1940	[-1, +2]	-49	

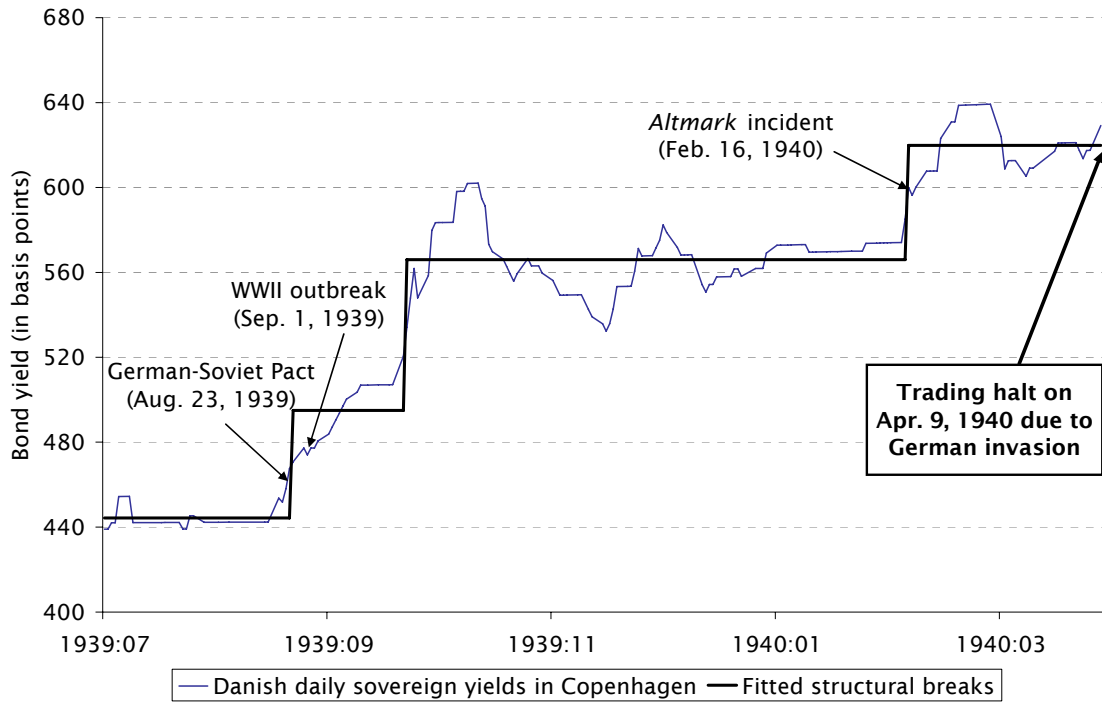
*Note:* The table shows the number of breaks selected by the procedure of Bai and Perron (1998, 2003), their 95% confidence interval in brackets showing the number of periods (days or weeks) surrounding the break date, the size of the break in numbers of basis points (the difference between average yields in the segments before and after the break), and a political or military event coinciding with the break.

**Table 3: Nordic government bond loans analyzed in the study.**

Country	Time period	Public pre-war threat assessments according to...		
		Historians	Bond markets	Agree?
Denmark	– Mar. 1939	None	None	Yes
	Apr. 1939 – Aug. 25, 1939	None	Some	No
	Aug. 25, 1939 – Apr. 1940	None	Some/Large	No
Finland	– Aug. 23, 1939	None	None	Yes
	Aug. 23, 1939 – Sep. 1939	None	Some/Large	No
	Oct. 1939 – Nov. 1939	Some	Large	No
Norway	– Aug. 1939	None	None	Yes
	Sep. 1939 – Mar. 13, 1940	None	Some/Large	No
	Mar. 13, 1940 – Apr. 9, 1940	None	Some	No
Sweden	1938 – Aug. 30, 1939	None	None	Yes
	Sep. 1, 1939 – Nov. 30, 1939	None	Some	No
	Dec. 1, 1939 –	Some	Some	Yes

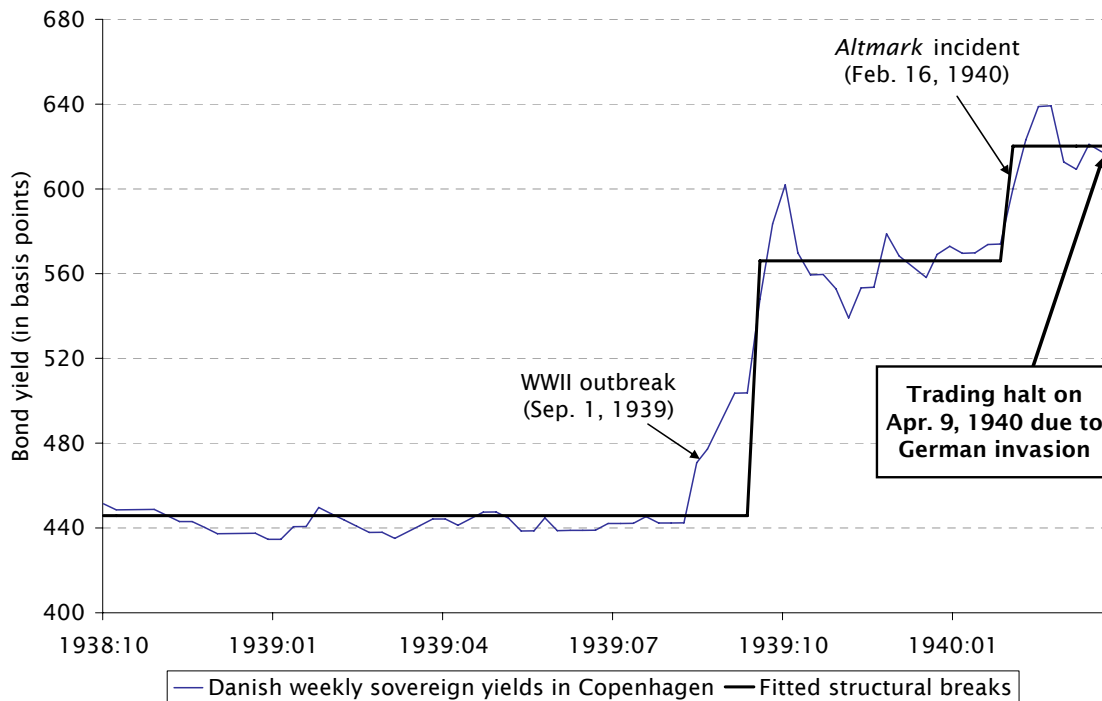
*Note:* When the market-based assessment says “Some/Large” this refers to the fact that the domestic yields reflected smaller threat increases than the foreign yields did in response to the same political events.

**Figure 1: Danish sovereign yields and structural breaks. Copenhagen market (daily data).**



Note: The figure is based on results in Table 2.

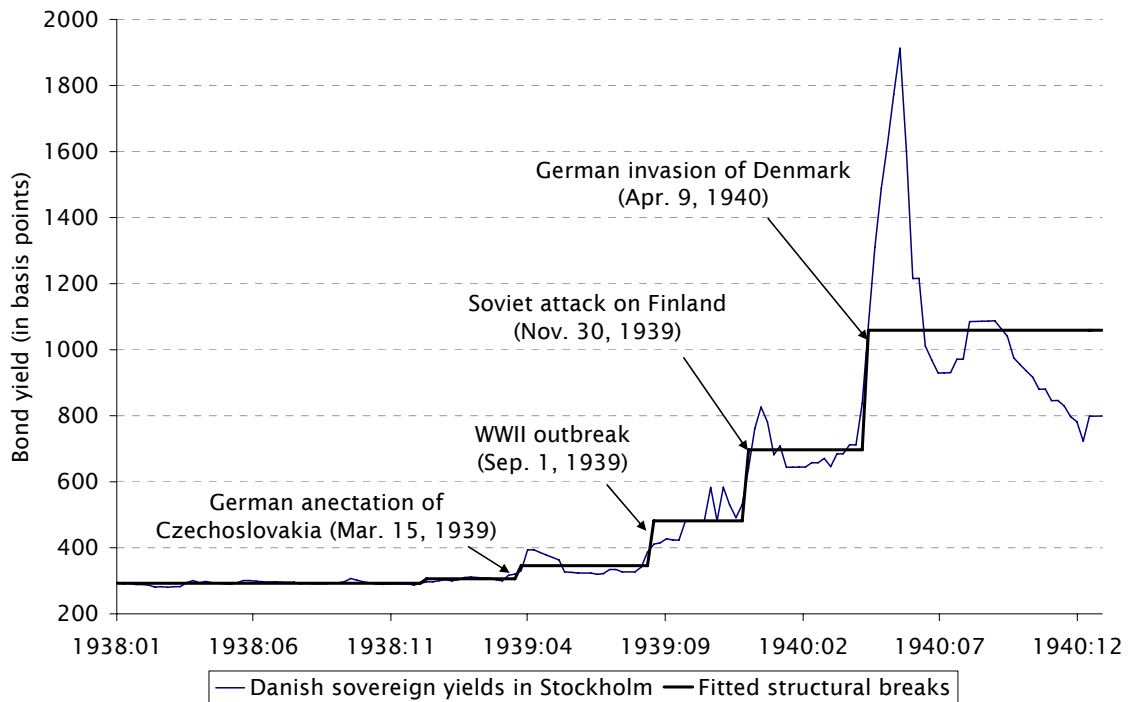
**Figure 2: Danish sovereign yields and structural breaks. Copenhagen market (weekly data).**



Note: The figure is based on results in Table 2.

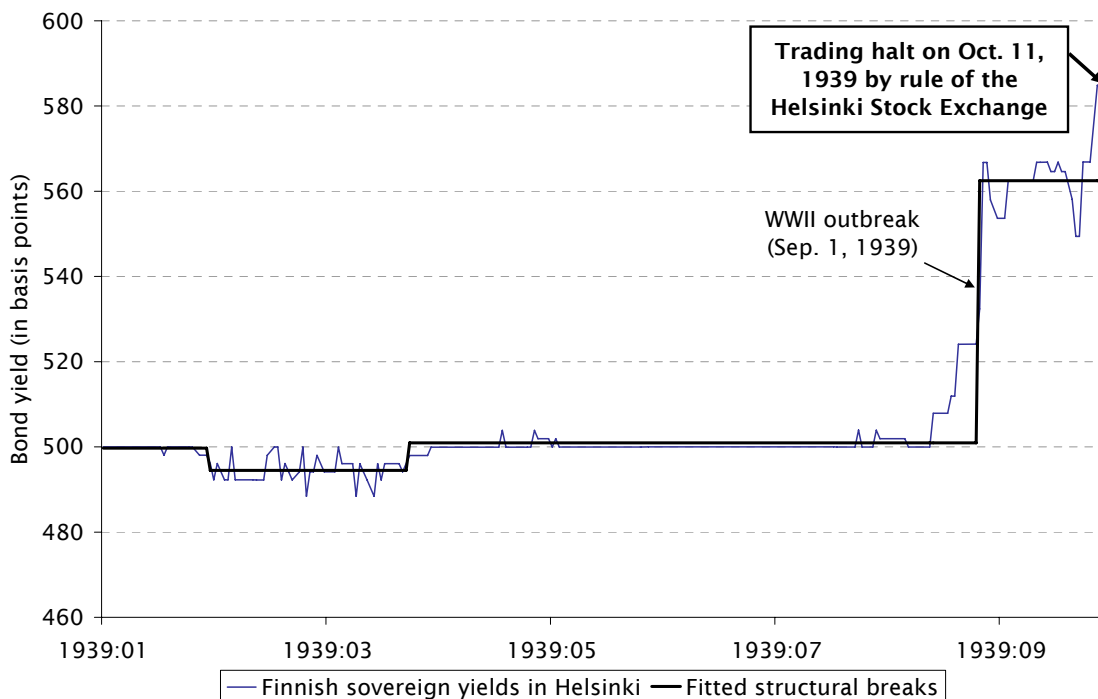


**Figure 3: Danish sovereign yields and structural breaks. Stockholm market (weekly data).**



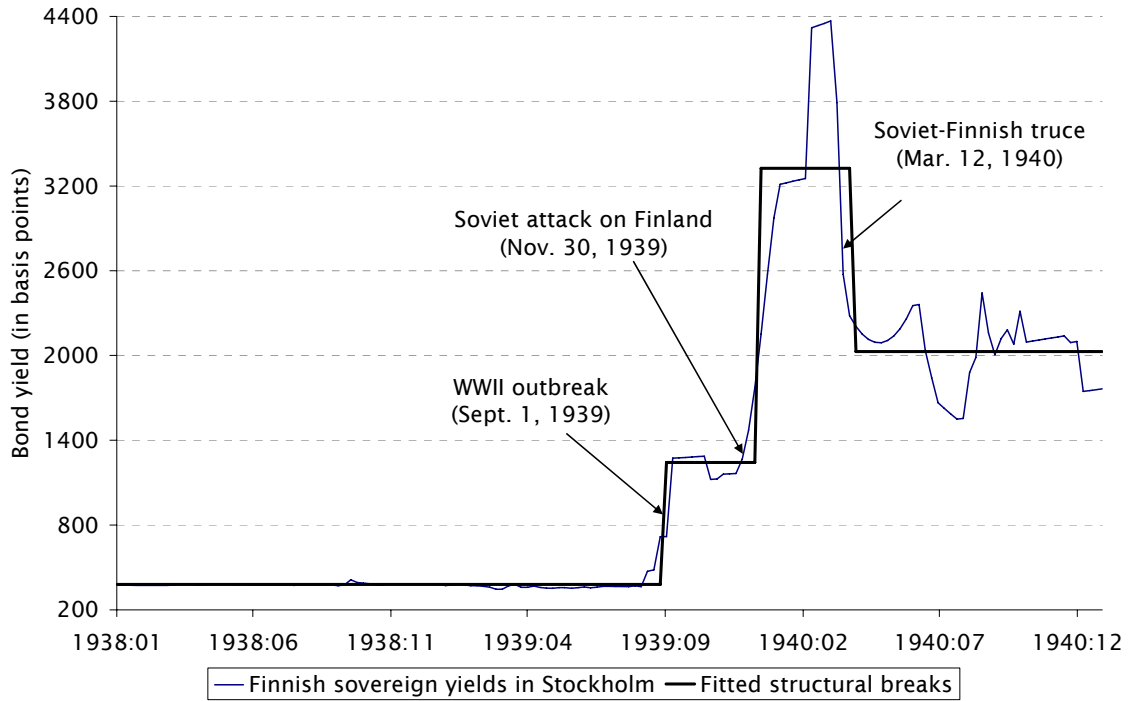
*Note: The figure is based on results in Table 2.*

**Figure 4: Finnish sovereign yields and structural breaks. Helsinki market (daily data).**



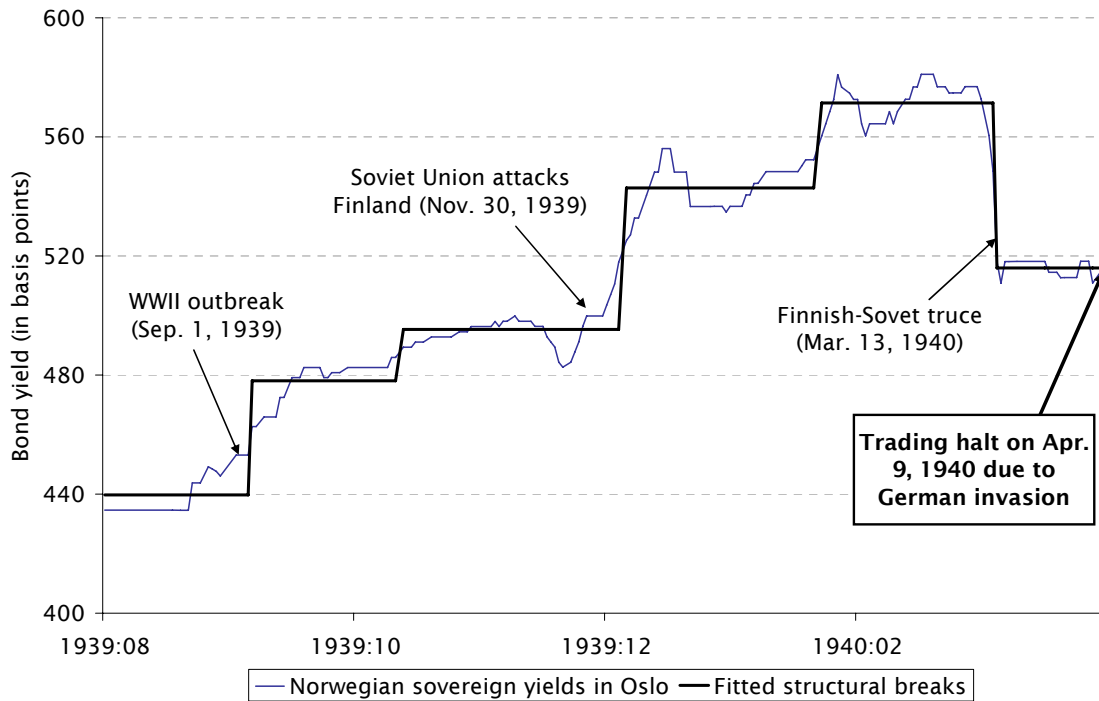
*Note: The figure is based on results in Table 2.*

**Figure 5: Finnish sovereign yields and structural breaks. Stockholm market (weekly data).**



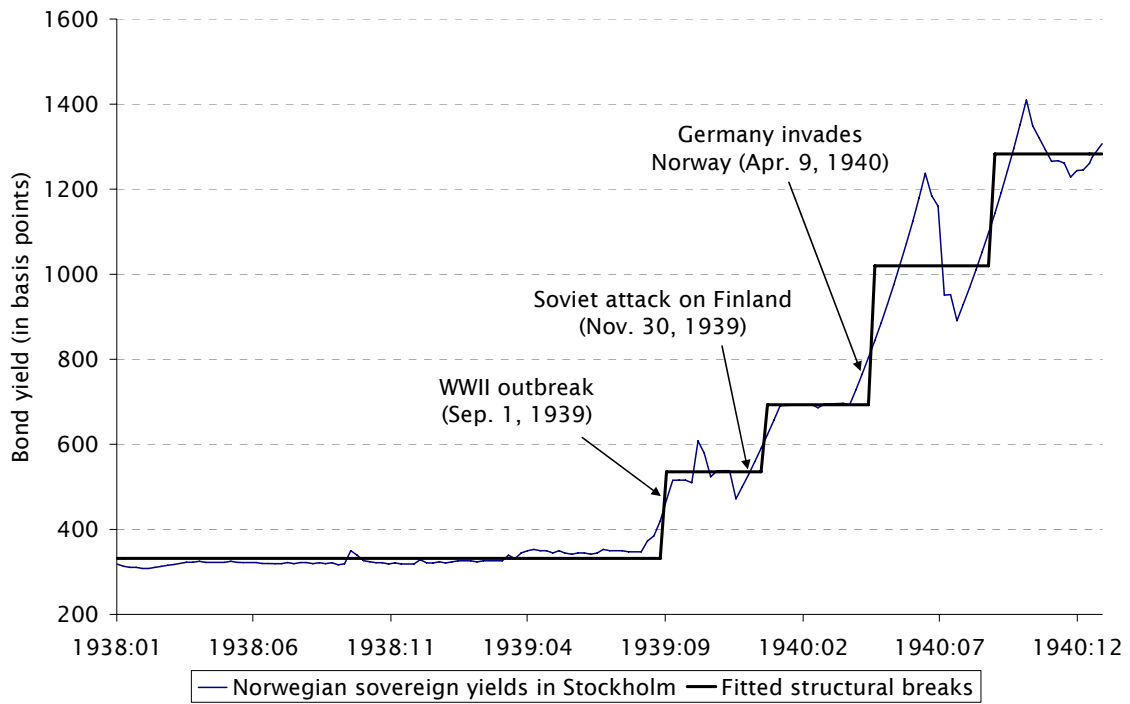
*Note: The figure is based on results in Table 2.*

**Figure 6: Norwegian sovereign yields and structural breaks. Oslo market (daily data).**



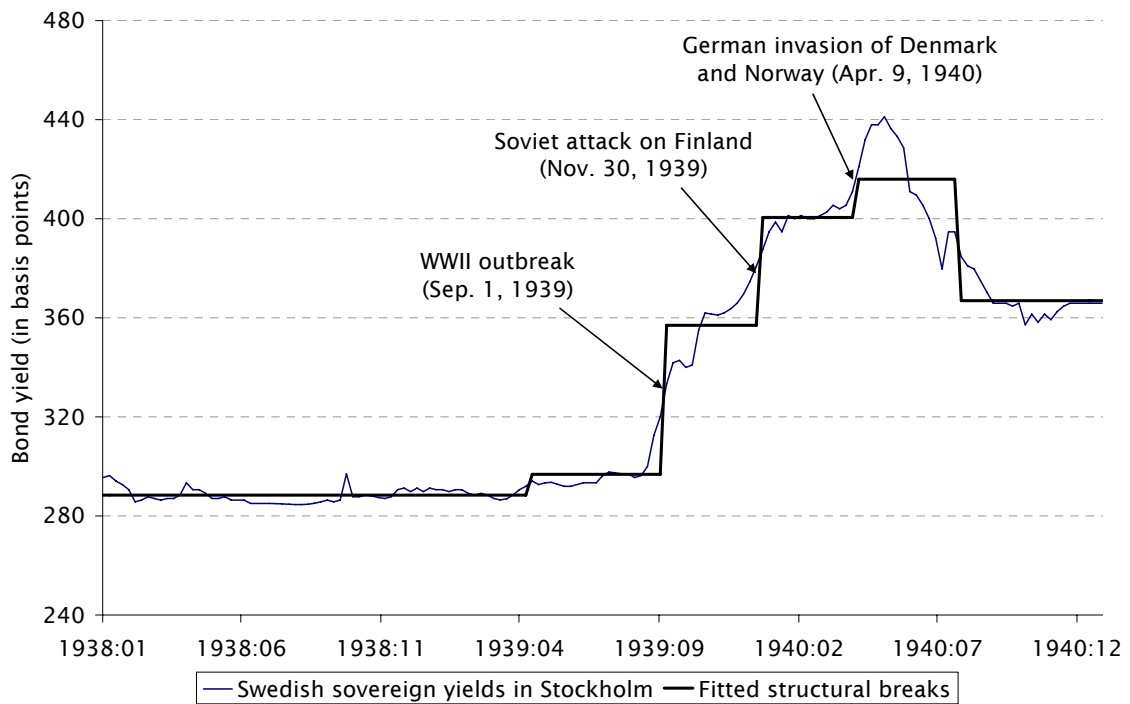
*Note: The figure is based on results in Table 2.*

**Figure 7: Norwegian sovereign yields and structural breaks. Stockholm market (weekly data).**



*Note: The figure is based on results in Table 2.*

**Figure 8: Swedish sovereign yields and structural breaks. Stockholm market (weekly data).**



*Note: The figure is based on results in Table 2.*