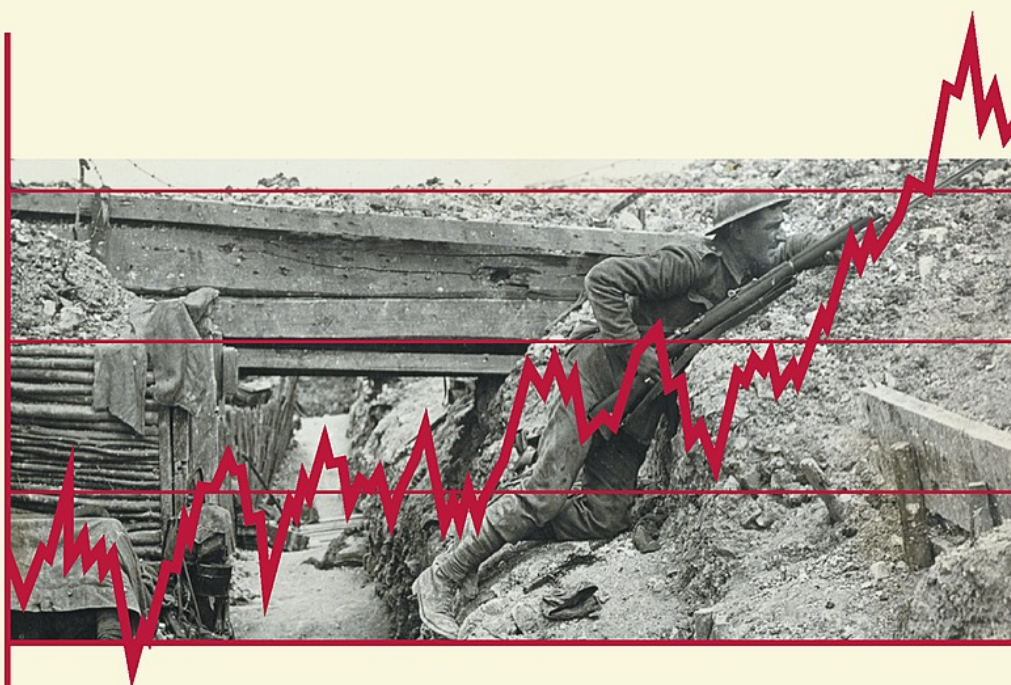


Tobias A. Jopp

War, Bond Prices, and Public Opinion



Economy and History 2

Mohr Siebeck

ECONOMY AND HISTORY

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2



Tobias A. Jopp

War, Bond Prices, and Public Opinion

How Did the Amsterdam Bond Market Perceive the
Belligerents' War Effort During World War One?

Mohr Siebeck

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Preface

The present monograph is a revised version of my habilitation thesis that was accepted by the Faculty of Philosophy, Art History, History and Humanities at *Universität Regensburg* in November 2019. In its published form, it consists of two parts: the printed version containing the argument; and an additional online Appendix providing necessary detail on the data and on technical matters.

A scientific study like the present one is a team effort, after all. It would not have been possible for me to accomplish this study if it was not for a number of people along the way, who believed in the study's feasibility and relevance and who, thereupon, generously lent their professional and emotional support to my efforts. First of all, I would like to express my deepest gratitude and appreciation to my supervisor, Prof. Dr. Mark Spoerer, who enabled me to pursue the idea that is at the center of this study and who showed great dedication and patience. However, his nudge to bring this study to a successful end came at exactly the right time.

I am also deeply indebted to Prof. Dr. Bernhard Löffler and Prof. Dr. Jochen Streb who acted as co-supervisors, and to Prof. Sibylle Lehmann-Hasemeyer, PhD, who, together with Mark Spoerer and Jochen Streb, took on the task of formally reviewing my habilitation thesis. The suggestions I received from both my supervisors and reviewers – on preliminary versions of my study as well as on the final product – were invaluable for preparing the version to be published eventually.

I also wish to express my deep appreciation to my colleagues at the Chair of Economic and Social History at *Universität Regensburg*, who have been important companions to me; Dr. Michael Buchner, Lino Wehrheim, MSc., Wolfgang Höflinger, M.A., Kathrin Pindl, M.A., Sebastian Pössniker, M.A., and Alfred Reichenberger, M.A. I owe a special thanks to my long-time office mate Michael Buchner who always had a sympathetic ear for my questions; his answers contributed significantly to giving shape to this study. Moreover, I am very thankful to our (former) student assistants for their support; in particular, Vera Drescher, Arthur Haberslacher, Johannes Kiechle, Silvana Hofmeister, and Julia Langholz.

Furthermore, I would like to thank the editors of the series *Economy and History* at Mohr Siebeck, especially Mark Spoerer, for incorporating my study. I also would like to thank Martina Kayser, Klaus Hermannstädter, Tobias Stähler, and Tobias Weiß, who monitored the publication process on behalf of Mohr Siebeck.

Above all, I cannot express in words how crucial the endless and unfettered support by my mother has been for me and for accomplishing the project “habilitation”. This study is devoted to her.

Regensburg, July 2020

Tobias A. Jopp

Table of contents

Preface	V
List of tables	XI
List of figures	XIII
List of abbreviations	XVII
I. Introduction	1
1. World War One as a study object of the economic historian	1
2. The war and sources on how it was perceived by the public	11
3. Capital market data as an alternative indicator of perception	17
3.1. Bond prices – how new an indicator?	17
3.2. What do bond prices say?	19
3.3. Agnostic event analysis	23
3.4. Pros and cons of the “capital market data approach to perception”	26
4. Study design	28
4.1. Research questions	28
4.2. Why Amsterdam?	30
4.3. Structure of the study	35
4.4. Placing the study	36
II. Historical background, sources, and data	39
1. The Netherlands and World War One	39
2. Sources on sovereign bonds traded in Amsterdam	47
2.1. Amsterdam bond prices	47
2.2. Additional bond price and miscellaneous data	55
3. Description of the created sovereign bond database	57
3.1. The Amsterdam cross-section of sovereign bonds	57
3.2. Market price indices and liquidity	66
3.3. Representative bonds versus country indices	78

3.4. Comparative market development and cross-trading	81
4. Potential and limitations of the database	89
4.1. Time frame	89
4.2. Price formation	92
4.3. Capital market regulation	95
4.4. Who were the investors?	96
III. Turning points in the perception of the Great Powers' war effort	105
1. The problem	105
2. Which breaks have been detected so far?	112
3. How timetable analysis can help	117
4. Data selection	120
5. Empirical findings	124
5.1. Shifting mean regressions as the technical point of departure ..	124
5.2. Turning points in investors' perception at a glance	127
5.3. Explaining turning points in the major powers' series	142
5.4. Explaining turning points in the minor powers' series	163
6. Checking for the turning points' robustness	171
6.1. Including economic variables	171
6.2. Results of the robustness check	179
7. Discussion	184
7.1. Turning points versus blips – the example of Germany	185
7.2. Agnostic turning points versus turning points “informed by historiography”	194
7.3. Simple sovereign bonds-based perception indices	199
IV. Perception of alliance credibility	205
1. The problem	205
2. Alliance formation before and during the war	209
2.1. The various alliances at a glance	209
2.2. Measuring the alliances' strength	211
3. Alliance credibility	214
4. Data selection	217
5. Empirical findings on a “global” test	225
5.1. Starting from a simple approximation of co-movement – correlation coefficients	225

5.2. Do we find cointegrating relationships?	227
6. Empirical findings on a “sub-periods” test	234
6.1. Correlation coefficients once more	234
6.2. Was perceived credibility unstable?	237
7. Discussion	244
7.1. Measuring the degree of alliance integration.....	245
7.2. What can Granger-causality tell?	246
V. Conclusions	249
1. Turning points summary.....	250
2. Have historians missed out on major events?.....	255
3. Alliance perception summary	256
4. Outlook.....	260
List of sources and references	263
Primary sources – Dutch historical newspapers/journals/ handbooks/laws	263
Primary sources – contemporary monographs/articles up until 1924 ..	264
Secondary literature	267
Online Appendix	303
Index	305

List of tables

Table 1: Main belligerents' characteristics before the outbreak of World War One	7
Table 2: Subscription results of German war bond issues	15
Table 3: Stock exchange closures on the occasion of World War One	32
Table 4: Comparative range and internationality of the sovereign bond segment in 1914	34
Table 5: Some stylized facts on the Dutch economy at war	43
Table 6: Summary of the created sovereign bond database	51
Table 7: Comparison of securities traded at Amsterdam in the long term	53
Table 8: Composition of traded securities by continent in the long term ..	55
Table 9: Additional data and their sources	56
Table 10: The cross-section of officially traded sovereign bond subseries by country	59
Table 11: Unofficially traded sovereign bond series by country	60
Table 12: Belligerent countries that saw their sovereign debt traded at Amsterdam	61
Table 13: Descriptive statistics on raw middle prices for the universe of sovereign bonds	62
Table 14: Order of resumption of trade in sovereign bonds up until August 1915	64
Table 15: A set of representative bonds for wartime	80
Table 16: Cross-trading of main belligerents' bonds during World War One	83
Table 17: The impact of the war's outbreak on bond-specific liquidity	100
Table 18: World War One – a surprise to investors?	108
Table 19: A summary of relevant breakpoints studies	113
Table 20: Selected studies providing timetables on World War One	118
Table 21: Timetable analysis – the most significant events of World War One!?	119
Table 22: The sample bonds' financial characteristics	122
Table 23: Descriptive statistics on the sample bonds' prices	125
Table 24: Suggested turning points in investor perception of the belligerents' war effort	135
Table 25: How big are the breaks in the yield series?	143

Table 26: Breaks in the English and French yield-to-maturity series	161
Table 27: The sample of Dutch municipal bonds	175
Table 28: The sample of Dutch companies' stocks	176
Table 29: Explaining sovereign yields	180
Table 30: Blips in the German 3% imperial loan	189
Table 31: Summary on the hypothesis test	196
Table 32: Did the war come as a surprise to investors in Amsterdam?	206
Table 33: Capabilities distribution for 1913 and 1918	212
Table 34: The dataset of representative bonds applied to assess alliance credibility	218
Table 35: Summary statistics on sovereign bond yields (1914–1919)	219
Table 36: Summary statistics on analyzed yield spreads	220
Table 37: Correlation of yield series among main belligerents	226
Table 38: Step one – DFGLS unit root test on representative bonds' yield spread	229
Table 39: Summary results on Johansen tests for cointegration	231
Table 40: Rolling cointegration test – within-core alliance view	240
Table 41: Rolling cointegration test – across-core alliance view	241
Table 42: Summary on rolling cointegration – was the core permanently integrated?	243
Table 43: Perceived alliance integration during wartime as per the “global test”	246
Table 44: Which alliance partner Granger-caused the other in the war- period?	247

List of figures

Figure 1: Real GDP per capita for selected regions in the long term	3
Figure 2: Real GDP per capita for selected countries over 1870–1950 (1913 = 100)	4
Figure 3: World export volume over 1870–2010	5
Figure 4: The proportion of subscriptions by size of piece	16
Figure 5: Detecting structural breaks	25
Figure 6: The typical quantifying research approach	30
Figure 7: Comparative sovereign bond market capitalization in 1914	33
Figure 8: Dutch GDP per capita in the long term	41
Figure 9: The Dutch economy’s share in world exports over 1870–2010 . .	41
Figure 10: The pricing of Dutch debt – the 3% <i>Nieuwe Werkelijke Schuld</i> .	44
Figure 11: Share of domestic securities in all securities in the long term . .	54
Figure 12: Age distribution of officially traded bonds as of 1914	63
Figure 13: How trade was resumed – the number of sovereign bonds in trade	66
Figure 14: Trading volume proxies	67
Figure 15: Monthly liquidity of the Amsterdam market for sovereign bonds	70
Figure 16: A simple market index	74
Figure 17: Sub-indices by continent	76
Figure 18: Sub-indices by faction	76
Figure 19: Assessing war parties’ comparative sovereign risk	77
Figure 20: The pre-war and wartime distributions of bond-specific liquidity	79
Figure 21: Country index versus representative bond – the example of the German 3%	81
Figure 22: Comparative market development – Amsterdam versus London	82
Figure 23: Comparison of selected cross-traded bonds’ weekly price development	85
Figure 24: Kronenberger’s monthly prices for the war period	88
Figure 25: Exchange rates at Amsterdam	91

Figure 26: The body count in the British sector of the Western Front by month	116
Figure 27: Current yields of four Central Powers' bonds traded in Amsterdam	128
Figure 28: Current yields of five Allied Powers' bonds traded in Amsterdam	130
Figure 29: Comparison of English and French loans' current yield and yield-to-maturity	132
Figure 30: The breaks in the German 3% – price, yield, and liquidity compared	145
Figure 31: The breaks in the Austrian 4% – price, yield, and liquidity compared	151
Figure 32: The breaks in the Ottoman 4% – price, yield, and liquidity compared	154
Figure 33: The breaks in the English 5% – price, yield, and liquidity compared	156
Figure 34: The French 5% compared – Amsterdam versus London	158
Figure 35: The breaks in the French 5% – price, yield, and liquidity compared	159
Figure 36: The breaks in the Russian 4% – price, yield, and liquidity compared	162
Figure 37: The breaks in the Bulgarian 5% – price, yield, and liquidity compared	165
Figure 38: The breaks in the Italian 3.5% – price, yield, and liquidity compared	167
Figure 39: The breaks in the Romanian 4% – price, yield, and liquidity compared	168
Figure 40: The breaks in the Serbian 4% – price, yield, and liquidity compared	170
Figure 41: Daily market liquidity as a centered 31-day moving average	172
Figure 42: The daily nominal interest rate on one-month loans (<i>prolongatie koers</i>)	173
Figure 43: Indices of nominal exchange rates at Amsterdam (24/8/1915 = 100)	174
Figure 44: Cumulative average returns indices (24/8/1915 = 1)	177
Figure 45: Growth rates of notes circulation	177
Figure 46: The distribution of blips over wartime	195
Figure 47: Explanatory share of hypothesized events versus estimated turning points	198
Figure 48: A simple periodization attempt – single country risks	201
Figure 49: A simple periodization attempt – faction indices	202

Figure 50: The wartime evolution of the alliances' cumulated CINC	213
Figure 51: Simple market indices for Amsterdam based on current yields	219
Figure 52: Yield spreads of the Central Powers' bonds over the war period	221
Figure 53: Yield spreads of the Allied Powers' bonds over the war period . .	222
Figure 54: Moving correlation between the German 3% and the Russian 4%	235
Figure 55: Additional pairwise moving correlations	236
Figure 56: Moving correlations including all country pairs	237
Figure 57: Exemplary rolling trace and AEG tests for the country pair Germany-Austria	239
Figure 58: Structural break summary	253
Figure 59: Marketplaces in wartime – spreads between Amsterdam, London, and Paris	261

List of abbreviations

AEG	Augmented-Engle-Granger (pre-test on cointegration)
AIC	Akaike information criterion
AP	Allied Powers
AUT	Austria
BRA	Brazil
BUL	Bulgaria
CHN	China
CINC	Composite index of national capabilities
CP	Central Powers
CUB	Cuba
CUSUM	Cumulated sum of squares (test)
CY	Current yield
DFGLS	Dickey-Fuller generalized least squares (test)
ENG	England
FRA	France
GDP	Gross domestic product
GER	Germany
HAC	Heteroscedasticity-and-autocorrelation-consistent (standard errors)
H. K.	Hoogste koers
HUN	Hungary
I(...)	Integrated of order ...
ITA	Italy
JAP	Japan
L. K.	Laagste koers
LOT	Lesmond, Ogden and Trzcinka (-measure of liquidity)
MAIC	Modified Akaike information criterion
NED	Netherlands
NIC	Nicaragua
OHL	<i>Oberste Heeresleitung</i> (Supreme Army Command)
OLS	Ordinary least squares (estimation)
POR	Portugal
POW	Prisoner-of-war
ROM	Romania
RUS	Russia
SER	Serbia

SIC	Schwartz information criterion
S. K.	Sloetkoers
TUR	Turkey (Ottoman Empire)
UK	United Kingdom
US	United States
VAR	Vector autoregressive (model)
VEC(M)	Vector error correction (model)
V. K.	Vorige koers
WWI	World War I
WWII	World War II
YTM	Yield-to-maturity

I. Introduction

1. World War One as a study object of the economic historian

For manifold reasons, the Great War¹ certainly is a watershed in the evolution of warfare, politics, economics, and the social sphere. For one, the belligerents set out to revolutionize warfare. The modern, industrialized war emerged providing the pre-condition for hitherto unprecedented numbers of soldiers killed, wounded, and taken prisoner-of-war (POW). This holds for World War One itself as well as for many other wars and conflicts to follow. While exact World War One casualty figures are still subject to debate, we may well estimate total casualties among the belligerent countries' military forces at some 32 million, give or take, including around nine million dead. In terms of deaths civilian populations certainly suffered on an equal scale.² Moreover, the various territorial adjustments in the aftermath of the war re-shaped the economic and political geography of Europe and provided the roots for new conflicts while keeping old ones alive. This was due to the dissolution of the Ottoman and Habsburg Empires as well as the territorial losses imposed on the German Empire, but also due to the various local conflicts about boundaries decided under the veil of the Great Powers' hegemonic struggle.³ Finally, to point to only one further aspect of many more that could be mentioned, World War One triggered economic regress in that it led countries everywhere to turn back to protectionism and also to bilateralism, a problematic combination that fundamentally confused the world market and impacted negatively on many countries' economic growth path well into the second half of the nineteenth century.⁴

¹ Henceforth, I will be referring to the war as "World War One".

² Cf. e. g. Ferguson (1998: 282–317, esp. 299), Winter (2012), and Prost (2014) on casualties among soldiers. Prost (2014) and Millward (2018) also discuss estimates of civilian losses; and Prost (2008) provides an example of a country-specific evaluation (here for France). Fundamental sources on POWs taken on both sides include Rachamimov (2002), Oltmer (2006), and Spoerer (2006, 2007). A fundamental source that all casualty estimates rely on in some way or another is the British War Office's *Statistics of the Military Effort of the British Empire During the Great War – 1914–1920* published in 1922. Moreover, Wilson/Prior (2001) and Little (2014) discuss the industrialized war; and Neiberg (2001, 2004) takes a broader perspective on World War One's place in the history of warfare.

³ Cf. e. g. Garber/Spencer (1994), Wolf et al. (2011), and Rauchensteiner (2014).

⁴ Cf. e. g. Eichengreen/Irwin (2010), Eloranta (2010), Wolf et al. (2011), Hynes et al. (2012), Jacks (2018), and Jacks/Tang (2018). Tooze/Fertik (2014) provide a somewhat deviating story

Figures 1 to 3 illustrate the point made on growth. Depicted in Figure 1 is the long-term evolution of real gross domestic product (GDP) per capita for three regions – Western Europe, the so-called Western offshoots (including, especially, the United States), and Latin America.⁵ A look at these regions, which comprise the majority of war parties, suffices to get a good impression of World War One’s short-term as well as long-term effects on economic growth. While panel (a) depicts average GDP per capita over the long stretch of time between 1870 and 2016, panel (b) zooms into the period 1870 to 1950. This is for the obvious reason that post-World War Two growth rates were higher on average than pre-1950 growth rates. Any depiction of long-term economic growth up until the present, thus, visually marginalizes what was going on in the two world wars and the period in-between. Note that the period of World War One itself is grey-shaded.

On the one hand, the figure illustrates that the depicted regions experienced secular positive economic growth until 1914, yet on different levels of GDP per capita. Here, the First Age of Globalization – to refer to the widely accepted view among economic historians – leaves its aggregate imprint.⁶ On the other hand, the figure also illustrates that Western European countries as a whole suffered considerably from fluctuations in economic growth – which is actually equal to saying: they suffered in terms of living standards – well up until 1950. The Western offshoots – here, the US-development shines through, though, in the first place – faced their growth crisis between 1929 and 1933/35, in the time of the Great Depression.

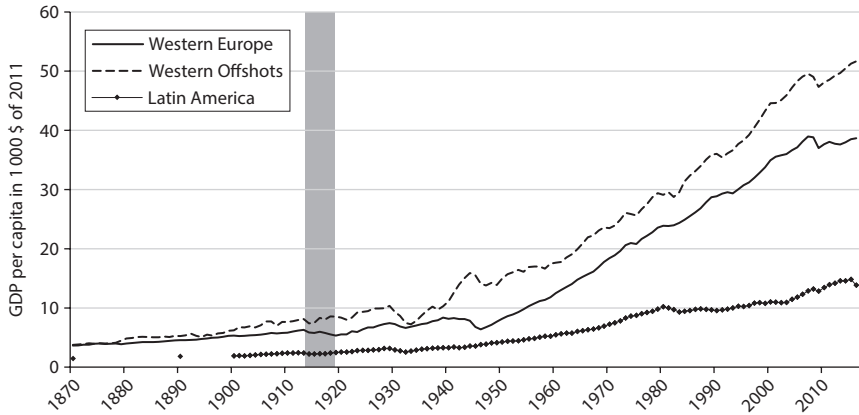
of the usual picture. It is certainly debatable whether commodity and financial markets saw the same degree of protectionism. From the angle of interwar German economic history, the fact alone that a considerable amount of foreign, and especially US-American capital flowed into the country after the implementation of the Dawes-Plan in 1924 suggests that financial markets were less impacted by protectionism; cf. Ritschl (2002) on the topic. When it comes to assessing World War One’s effect on the global economy as well as on specific countries, Jordà et al. (2019) is an excellent source one should not miss. The paper’s title – “The rate of return on everything, 1870–2015” – is pretty much self-explaining.

⁵ The reason why I do not show series on regions like Africa or Asia is data quality; cf. the discussion of the Maddison Database, from which I took the data, in Bolt et al. (2018).

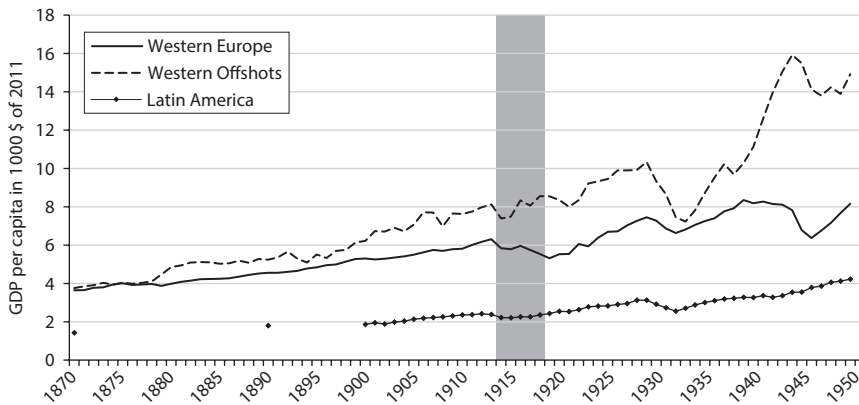
⁶ Economic historians tend to locate the beginning of globalization at around 1820. The main argument is that since then, in the aftermath of the Napoleonic Wars and the Congress of Vienna, we observe what economic historians say is the essence of globalization (as a process, not as a state), namely that price differences for the same goods between markets all over the world began to fall. While we observe long-distance trade relationships to emerge and increase in number well before the nineteenth century, prices of (essentially) the same goods between two marketplaces far away from each other had not sufficiently converged, though. This view on the timing and essence of globalization is, of course, not unchallenged; cf. for example, Findlay/O’Rourke (2003, 2008), O’Rourke (2005), Choi/Dupont (2007), Dobado-Gonzalez et al. (2012), and especially the controversy between O’Rourke/Williamson (2002a, 2002b, 2004) and Flynn/Giráldez (2004).

Figure 1: Real GDP per capita for selected regions in the long term

(a) GDP per capita over 1870–2016



(b) GDP per capita over 1870–1950



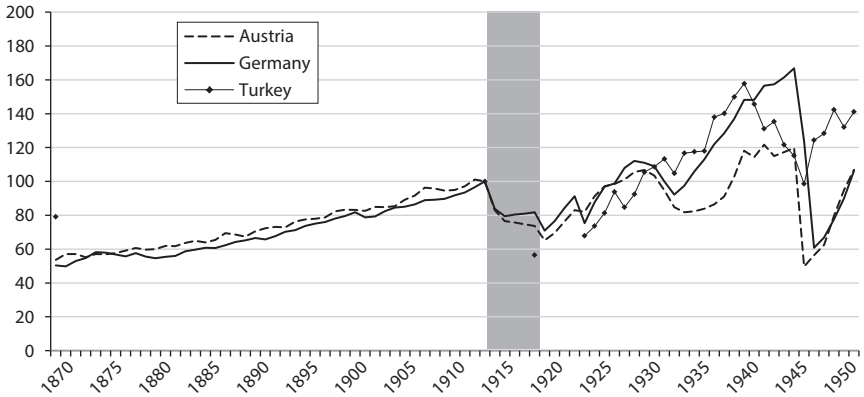
Sources: Maddison database available at <https://www.rug.nl/ggdc/historicaldevelopment/maddison/releases/maddison-project-database-2018>, as updated and described by Bolt et al. (2018); accessed: 3 May 2019.

Notes: Depicted are the GDP series labelled “rgdnpac”.

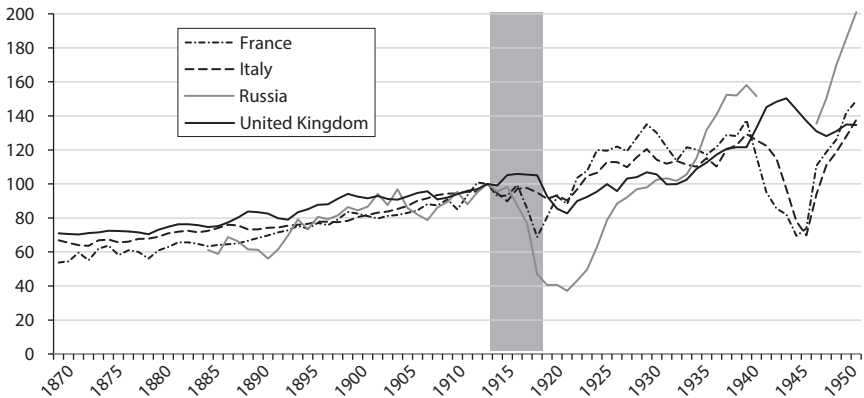
Figure 2 details the picture emerging for selected European countries. Panel (a) illustrates the fundamental break in the trend of economic growth coinciding with World War One for selected Central Powers, and panel (b) does so for selected Allied Powers. Turning to the upper panel first, the graphs imply that World War One was connected to decreasing economic growth in the short term and further stagnation in the long term. Germany, as one of the world’s leading

Figure 2: Real GDP per capita for selected countries over 1870–1950 (1913 = 100)

(a) Selected Central Powers



(b) Selected Allied Powers



Sources: Cf. Table A.1 in online Appendix 1.1.

Notes: The underlying series are expressed in constant 2011 \$.

economies then as now, reached its long-term growth trend only in 1944, but with a highly deformed economy under the Nazis.⁷ Regarding the lower panel, the victorious Allies like France and the United Kingdom also saw a break in trend growth that lasted for a long time.

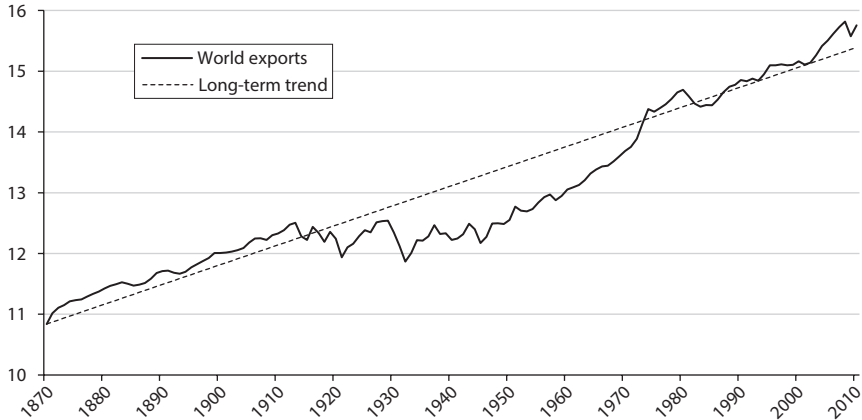
Using recent data provided by David S. Jacks and John P. Tang, Figure 3 shows World War One's effect on world export volume.⁸ In the short term, world

⁷ Cf. Spoerer (2005) and Buchheim (2011).

⁸ Cf. Jacks/Tang (2018).

export volume fell severely due to immediate trade disruptions caused by protectionist policies as part of the transformation of peace time economies into war economies, the Allied Naval Blockade of Germany, and German submarine warfare impacting on merchant shipping. In the long term, it took the world economy until the early 1970s to recover from the initial shock to the system, which was reinforced by the Great Depression and the even more devastating World War Two.⁹

Figure 3: World export volume over 1870–2010



Sources: Data are from Jacks and Tang (2018). Data available at: <http://www.sfu.ca/~djacks/data/publications/index.html>; accessed: 8 May 2019.

Notes: Export volume is logged and in constant 1990 \$. Note that the y-axis is cut.

Now, zooming in on World War One, its outbreak in late July 1914 put the European Great Powers, struggling for hegemony, to the ultimate test. The traditional view among historians, but also political scientists focusing on alliance research, is that it was primarily the mechanics of the international system of alliances established over the past decades that dragged so many countries into war. While this view has many times been challenged and does no longer reflect the mainstream, it is still a (simple) fact that alliances did form – two major ones with the Central and Allied Powers, and many more in detail – and that these alliances exhibited their very own dynamic over the course of the war, propelled by each player's very own geopolitical and economic interests.¹⁰ Following the assassination of Archduke Ferdinand on 28 June 1914, which many may not have

⁹ Cf. Jacks (2018) for a more detailed discussion. Kenwood/Lougheed (1999) provide a long-term view.

¹⁰ Cf., among others, Kennedy (1976, 1980, 1984, 1989), Levy (1981, 1990/91), Sagan (1986), Williamson (1988), Geller/Singer (1998), and Levy/Thompson (2010).

expected at the time to cause more than another localized conflict in the Balkan, the world witnessed the ultimate escalation of persistent, latently smoldering hostilities. According to recent work of Christopher Clark and Roger Ransom, in particular, a mix of negligence and inclination to gamble on collective and personal ego may best explain the sudden switch from peace to war mode.¹¹ The pre-war “arms race” had equipped the Great Powers with enough military capacity to at least take that initial step and hope, individually, for a quick victory.¹² Breaking down the pre-war odds of winning the war to a comparison of the alliances’ resource endowments, the victor seems to have been fixed from the start.

Table 1 illustrates this reasoning by assembling some basic statistics on the major powers’ starting positions around 1913/1914. Presented are figures on economic performance in the form of GDP per capita, public debt, population, and peacetime strength of land as well as naval forces. The latter is approximated by the count of existing plus projected (super-)dreadnoughts.¹³ The degree of a state’s indebtedness, for example, gives an impression of the players’ room for financial maneuvers – the UK and Germany certainly had the greatest. However, in terms of the peacetime strength of military forces, which is indicative of what pressure a player may immediately put upon its opponents, and of population, which is indicative of the potential to levy an army in the medium term, the Allied Powers clearly dominate the picture.¹⁴

Considering that many more countries would enter into the war on the side of the Allied Powers than would on the side of the Central Powers, the Allies’ odds of winning could only rise alongside the growing resource base. Thus, it can be argued that the Allied Powers’ victory did not, and does not, come as a surprise at all.¹⁵ However, what principally does come as a surprise to us looking back is the war’s length of more than four years; this element of self-perpetuation it has shown. Not only does this come as a surprise to us, thereby triggering immense academic effort to come up with explanations, but it also came as a surprise to the belligerents’ ruling political and military elite who indulged in a “short-war illusion” based on, obviously, all kinds of wrong assumptions on

¹¹ Cf. e.g. Clark (2013) and Ransom (2016, 2018a, 2018b). Offer (1995) brings in “honor” which may be a reasonable addition to negligence and ego (or confidence).

¹² Cf. e.g. Geyer (1984), Herrmann (1996), Reinschedl (2001), Stein (2007), Eloranta (2013: 71–81, 2018).

¹³ On the importance of the dreadnought as a “breakthrough technology”, cf. Herwig (1991).

¹⁴ Cf. Thies (1987: 308–309), Broadberry/Harrison (2005: 7–10), and Broadberry (2018: 77–82) for similar overviews. Offer (2018) extends the view on energy, food, and technology. On the link of maritime warfare with coal, cf. specifically Goldrick (2014).

¹⁵ We may ask ourselves whether this setting was already known to the political and military leaders at the time – if not to the public as a whole. I think, at least, political and military leaders had a good chance to know about that, because my source for population figures and the military forces’ strength, which is *The Statesman’s Year-Book*, is a contemporary source.

Table 1: Main belligerents' characteristics before the outbreak of World War One

Player	GDP per capita (1999 Int. \$)	Public debt (in percent of GDP)	Population (in 1 000)	Peacetime strength of land forces (no. of soldiers in 1 000)	Peace time strength at sea (no. of [super-] dreadnoughts)
United Kingdom	4 921	27.9 %	46 090	730	26
France	3 485	66.3 %	39 602	705	4
Russian Empire	1 414	48.8 %	128 865	>1 200	4
			214 557	>2 791	34
German Empire	3 648	38.5 %	67 812	623	17
Austria-Hungary	3 465/2 098	63.3 %	49 883	368	2
Ottoman Empire	1 213	n/a	21 280	230	1
			138 975	1 441	20

Sources: GDP: Maddison database available at <https://www.rug.nl/ggdc/historicaldevelopment/maddison/re-leases/maddison-project-database-2018>, as updated and described by Bolt et al. (2018); accessed: 3 May 2019. Public debt: Abbas et al. (2010) and Historical Public Debt Database available at <https://www.imf.org/external/datamapper/datasets/DEBT>; accessed: 14 May 2018. Population and strength of military forces: The Statesman's Year-Book: Statistical and Historical Annual of the States of the World for the Year 1913 and The Statesman's Year-Book: Statistical and Historical Annual of the States of the World for the Year 1916 (1913/1916: 53–55, 616–617, 796–798, 871–872, 1 201–1 203, 1 309–1 311).

Notes: GDP and public debt figures are for 1913. Population figures are for 1914/15. Colonial population is excluded. Population of Russia and strength of Russia's land forces refer to its European part. Peacetime strengths refer to 1912/1913.

political, diplomatic, military, and economic matters. The widespread belief that war would be decided rather quickly did not prove to be successful. The war developed into a “war of attrition” characterized by trench warfare and a long-term deadlock.¹⁶

Besides exploring economic factors that may have had an effect on the belligerents' decision to go to war¹⁷ and besides putting World War One in a long-term perspective regarding economic growth and development¹⁸, explaining the length of the war has been a third natural endeavor for the economic historian. For the war has impressively shown that relying on a comparatively richer (smaller) resource base – with resources defined broadly – does not automatically lead to quick victory (defeat). Rather, what matters is the ability to effectively draw on

¹⁶ Cf. e.g. French (1988) on attrition, and Farrar (1973), Herwig (2002), and Lambert (2012) on the short-war illusion.

¹⁷ Cf. e.g. Offer (1989, 1995, 2018), Ferguson (1994), Crafts (2018), Eloranta (2018), James (2018), and Milanovic (2018).

¹⁸ Cf. e.g. Dub (1920, 1922), Winkler (1940), Markevic/Harrison (2011), Foley-Fisher/McLaughlin (2014), Smith et al. (2016), Rockoff (2018), and Vonyó (2018).

the resource base, that is, the ability to efficiently allocate whatever resources to their best uses. In other words, it is a matter of installing and operating well-working war economies under numerous resource constraints. Economic historians have shown that the Great Powers' economies, when war broke out, were not up to the task, were economically not prepared for war. They also have shown that, apart from initial ad-hoc measures like suspending the gold standard and thereby empowering central banks that had formerly been restrained by the gold cover and convertibility rules to endlessly print money, states exerted serious efforts on transforming the peace into war economies only since the turn of 1914/1915. The belligerents were realizing that they had been taken in by a "short-war illusion".¹⁹

So far, these are the more obvious points at which economic historical research can connect with general historical research. The latter has produced a vast amount of literature we may conveniently reduce likewise into three main subjects, namely literature on why World War One happened at all²⁰, literature on how the belligerents managed to keep it going and make it so bloody a war²¹, and literature on how the war was perceived in contemporary public opinion which, in turn, might well have impacted on political and military decision-makers and -making. Much of economic historical scholarship falls into the first two main subjects. However, a maybe not so obvious point, at which economic history – or more precisely: economic historical research grounded more rigorously in economics – can also connect with general historical or also political science research on World War One is the third main subject. To explore such a way is what this study is about.²²

The war in public opinion is a persistent topic in the historiography of World War One. However, scholars have been interested especially in how the public perceived the outbreak of the war. Regardless of whether or not war had come as a surprise to the general public, there is a consensus that it provoked ambiguous feelings on all sides, ranging from sheer enthusiasm to the greatest

¹⁹ Two fundamental works on the economics of World War One are the collective volumes edited by Broadberry/Harrison (2005, 2018). Regarding this paragraph, cf. e.g. Broadberry/Howlett (2005) on Britain's war economy; Galassi/Harrison (2005) on the Italian one; Gatrell (2005) on the Russian one; Hautcœur (2005) on France's one; Ritschl (2005) on the German one; Pamuk (2005) on the Ottoman one; Rockoff (2005) on the US one; and Schulze (2005) on Austria-Hungary's one. Further literature on the subject matter include, among others, Feldman (1966, 2008), Wegs (1979), Hardach (1987), Zilch (1987), Wrigley (2000), t'Hart (2014), Plumpe (2015), Wixforth (2015), Ziegler (2015), Harrison (2016, 2018), Seligman (2017), Jopp (2018b), and Markevich (2018).

²⁰ Cf. e.g. Berghahn (1973, 2013), Farrar (1981), Sagan (1986), Henig (1993), Ferguson (1994), Remak (1995), Rotte (1998), Fromkin (2004), McMeekin (2011), Clark (2013), MacMillan (2013), Neiberg (2013), and Hamilton (2014).

²¹ Cf. e.g. Hardach (1987), Wehler (1994), Herwig (1997), Ferguson (1998), Keegan (1999, 2003), Chickering/Förster (2000), Stevenson (2005, 2012), Beckett (2007), and Neiberg (2007).

²² Recent surveys of research on World War One include Thiemeyer (2007), Chickering (2009), Angelow (2011), Meteling (2011), Eloranta (2013), Kramer (2014a, 2014b), Epkenhans (2015), Neitzel (2015), and Müller (2016).

anxiety. One much debated topic is the seemingly widespread phenomenon of *war fever* among the populations in the initial phase. Beyond the “spirit of 1914” phenomenon, to refer to the main title of Jeffrey T. Verhey’s study of 1991 on Germany²³, the literature has been debating on the more general questions as to what extent a population’s confidence in its own country’s ability to win the war changed as time passed and of how the efforts of “enemy populations” were assessed.²⁴ The historical picture emerging in this context depends on the type of historical source evaluated – a point taken up again in a few lines – and the class of population addressed.

As yet, it has not been attempted to any significant degree to *quantitatively* measure: (i) how the public perceived the course of the war and the belligerents’ war effort; (ii) which single war or political event made – expectedly or unexpectedly – a large or little impression, especially over the “stalemate period”;²⁵ (iii) how the alliances’ publicly perceived odds of winning, so to say, changed with certain events; and (iv) at which point in time the public began to expect the end of the war to be near.²⁶ Indeed, this is pretty much impossible to measure for any country’s population as a whole when aiming at maximum representativeness. However, it might be possible for sub-entities of the population. Here, this study comes into play. It sets out to assess public perception of the war through the lens of the capital market. It uses a hitherto largely neglected source for public opinion, namely the prices at which sovereign debt – specifically: the belligerents’ sovereign debt – was traded *during* the war. Historical bond prices certainly are a natural study object of the economic historian/economist.²⁷ Yet, as far as public opinion research on World War One is concerned, their potential is, for the most part, unexploited.

I will be looking into the development of sovereign bonds traded at one of the few trading places that actually offer useful data for the period of World War One, at all. This will be the trading place of Amsterdam, located in the Nether-

²³ Verhey (1991). Cf. also Tuchman (1962, 1964), Dülffer/Holl (1986), Kruse (1991), Van der Linden (1991), Van der Linden/Mergner (1991), Joll (1992: 199–233), Fries (1994), Geinitz (1997, 1998), Hirschfeld et al. (1997), Raithel (1997), Rohkrämer (1997), Ferguson (1998: 174–211), Sanborn (2000), Bruendel (2003), Gregory (2003), Pennell (2012), and Becker (2015).

²⁴ Cf. Recktenwald (1929), Hicks (1949), Mommsen (1969), Dahlin (1971 [1933]), Hanak (1962), Flood (1990), Daniel (1993), Krumeich (1993), Quandt/Schichtel (1993), Schichtel (1993), Fries (1995), Buschmann (1997), Kruse (1997), Ziemann (1997), Glant (1998), Stöber (1998), Paddock (2004), Silbey (2005), Ziemann (2007), Gregory (2008), and Walker (2008).

²⁵ The literature generally agrees that this was the stretch of time between early to mid-1915 and late 1917 to early 1918.

²⁶ The little effort spent on this as yet comes in the form of economic historical studies to be discussed in more detail later; cf. Hall (2006), Oosterlinck/Landon-Lane (2006), Christodoulaki et al. (2012), Jopp (2014, 2016, 2018a), Adams (2015), Hanedar et al. (2015), Oosterlinck (2016), et al. Hanedar et al. (2016), Hanedar/Yaldiz-Hanedar (2017), Duarte et al. (2018), Hanedar et al. (2018a, 2018b), and Schaltegger/Schmid (2019).

²⁷ Cf. Ferguson/Schularick (2006), Flandreau/Flores (2009, 2012), Sicotte et al. (2010), Edlinger et al. (2013), Weller (2015), Reinhart/Trebesch (2016), and Basile et al. (2017).

lands which remained neutral throughout the war. By the turn of 1913/1914, Amsterdam had grown into *the* national financial center of the Netherlands, outperforming Rotterdam, and was about to become a major international financial center, too, thanks to the war;²⁸ the stock exchange, which is quite old, formed the financial center's core. If we follow Lodewijk Petram (2014), its origins can be traced back to the seventeenth century making the Amsterdam Stock Exchange, in fact, the world's oldest *permanently* operated stock exchange.²⁹

Sovereign bonds represent a form of tradable credit supplied by the general public to states. The prices quoted at the Amsterdam Stock Exchange over a considerable stretch of time during the war can be interpreted as a real-time opinion poll conducted among contemporary investors or, respectively, bondholders as to how the debtor countries were faring in their eyes. This measure of public opinion has certain advantages over the historian's principal sources on the subject matter, the probably biggest one being that it condenses the perception of a principally large number of (anonymous) market participants into a single measure, readily observable for Amsterdam on a *daily* basis. Hence, we are dealing with a sort of true mass data on public perception.

This begs the question of which people's perception we are exactly dealing with here. Who were the investors that traded sovereign debt at the Amsterdam Stock Exchange? I will address this question in more detail in Chapter II, as part of a source critique on my quantitative data. However, to give a preview, we can, with some certainty, say this: (i) Securities – stocks and bonds – made up a larger proportion of Dutch people's wealth than we find elsewhere, for similarly developed economies; (ii) Thus, there likely were relatively more individuals among the investors (in distinction to institutional investors); (iii) These individuals were likely made up to a larger extent of middle-class households (in distinction to upper-class households); (iv) The proportion of foreign investors (in distinction to domestic investors) actively trading securities decreased, compared to the pre-war situation; (v) But there still were foreigners active, not the least because Amsterdam served as a safe haven for foreign capital. Beyond that, and

²⁸ This section is fundamentally based on Brenninkmeyer's account of 1920 which, to the best of my knowledge, is still the most comprehensible (non-Dutch) account on the Amsterdam Stock Exchange as of 1914. According to Brenninkmeyer's (1920: 48) assessment, the Amsterdam Stock Exchange represented a "strongly English influenced transition stage" ("[...] stark englisch orientierte Übergangsstufe [...]"), that is, it resembled the London Stock Exchange in organization.

²⁹ Cf. e. g. Petram (2014). The literature on the Amsterdam Stock Exchange includes Brenninkmeyer (1920), Neal (1987), Euwe (2009, 2010), Koudijs (2015), and Norman/Wills (2015). On the rise of stock exchanges in the nineteenth century and in the first half of the twentieth century, cf. e. g. Croner (1923), Snowden (1987, 1990), Häuser (1988), Gömmel (1992), Michie (1999, 2004a, 2004b, 2006a, 2006b, 2010), Hickson/Turner (2005), Grossman/Shore (2006), Kiehling (2006), Van Nieuwerburgh et al. (2006), Oosterlinck (2010), Le Bris (2012), White (2013), Mikkelsen (2014), Buchner (2017, 2019), Grossman (2017), Hannah (2017), and Odlyzko (2017).

Index

- Ability-to-pay, of Russia 163
- Acceptances 99
- Accrued interest 49
- Aisne, Battle of the 192
- Algemeen Handelsblad, as a source 47–50, 134–140, 188–191
- Algemeen Handelsblad, as seen by German authorities 141
- Alliance of the Three Emperors 209
- Alliances 29, 36, 205
 - also cf. Allied Powers
 - also cf. Central Powers
 - Bilateral 29, 207, 214, 216, 230, 244–246, 257–258
 - Credibility 36, 207–208, 215–216
 - Credibility discount 259
 - Credibility spillover 216, 259
 - Definition 214
 - Disintegration of 233, 242
 - Formation 36, 207, 209–210, 214
 - Formed ad-hoc 29, 214
 - Formed permanently 214
 - Global test of alliance credibility 208, 216, 225–234, 238, 245–246, 248
 - Integration, degree of 208, 244–246
 - Research on 5, 207–208
 - Sub-periods test of alliance credibility 208, 216–217, 234–244
- Allied naval blockade 5, 42, 52, 157, 192, 233
- Allied Powers 28–29, 35, 61, 75, 112, 120–130, 216, 257–259
 - Alliance’s credibility 205–207
 - Alliance’s degree of integration 245–246
 - Cointegration of related bonds 217–244
 - Comparative sovereign risk 77
 - Coverage regarding bond prices 60
 - Formation of 5, 209–210
 - Granger-causality 246–248
 - Growth of selected 3–4
 - Index of perception 200–203
 - Liquidity of related bonds 71–72
 - Market index 75–76
 - Resource base 6–7, 212
 - Strength 211–213
 - Turning points in related bonds 134–203, 251–255
- American Civil War 37, 112, 251
- Amiens, Battle of 149, 169, 195
- Amsterdam, trading place of 9
 - also cf. Amsterdam Stock Exchange
 - Nature as international financial center 10, 45–46, 99
 - Selected exchange rates 91, 174
- Amsterdam Stock Exchange 10–11, 29
 - Age distribution of traded bonds 61–63
 - Belligerents covered 61
 - Beurs-Comité voor Publieke Fondsen 46
 - Bond-specific liquidity 79–80, 100–101, 134–139, 145, 151–158–159, 161–170
 - Closure 32, 106, 108–109
 - Comparison with London Stock Exchange 10, 93
 - Composition of traded securities 52–55
 - Daghandelaren 93
 - Descriptive statistics on bond prices 62, 125, 219–220
 - Effectenboek 48
 - Effectensocieteit opgericht door het Algemeen Beurs-Comité 46
 - Effective transaction price 93–94
 - Gids bij de Prijs-Courant 48, 66, 73

- Grey market 49–50, 121
- Historical price account of 47–50
- Hoekmannen 93
- Internationality 34, 60
- Market capitalization 33
- Market index 73–77, 219
- Market liquidity 70–72, 172, 182
- Middle price system 48, 51, 93–95
- Nature of investors 10–11, 96–103
- Officieele Prijscourant 47–49
- Opening hours 93
- Organization 46, 49, 92–95
- Price database 51–56
- Price formation 49, 92–95
- Price observations by country 58–59
- Price reporting 48–49
- Prolongatie koers 57, 172–173, 179, 182, 184
- Prolongatiekrediet 97–98
- Representative bonds 79–80, 100–101, 120–132, 217–225
- Resumption of trade in bonds 33, 63–66
- Selected bond prices 44, 85–87, 108–109
- Stock Exchange Act (Beurswet) 95
- Trade restrictions 95–96
- Trading volume 66–68
- Vereeniging voor den Effectenhandel te Amsterdam 46–48, 67, 92–95, 98
- Arbitrage 44, 84, 102, 233, 262
- Archduke Ferdinand, assassination of 5, 110
- Argentina 59, 65
- Arms race 6, 106
- Arras, Battle of 192
- Asquith, Prime Minister Herbert Henry 146, 256
- Austria 31, 35, 42, 45, 56, 59, 61, 64, 80, 100, 103, 107, 155, 164, 171, 186, 205–206
 - also cf. Central Powers
 - also cf. Habsburg Empire
 - also cf. Hungary
 - also cf. Vienna
 - also cf. Vienna Stock Exchange
 - Advance against Montenegro 163, 166, 186
 - Alliance affiliation 112, 209–210
 - Archduke Ferdinand, assassination of 5, 110
 - Cointegration analysis of representative bond 217–221, 226–230–233, 236–239, 242–247
 - Cross-trading of representative bond 83–88, 108
 - Declaration of war on Serbia 205
 - Declaration of war received from Romania 184
 - Default on sovereign debt 184
 - Denouncement of real union with Hungary 164
 - Economic growth 4, 39
 - Final retreat 194
 - Index of perception on 201
 - Localized conflict in the Balkan 6, 107, 111, 205
 - Peace offer to Allies 157
 - Resource base 7, 212
 - Trench warfare trap 233, 244, 249, 258
 - Turning points analysis of representative bond 112, 120–124, 127–129, 134, 150–153, 180, 184, 196–201, 251
 - War bonds 96
- Austria-Hungary, cf. Austria and cf. Hungary
- Austro-Prussian War 18
- Autocorrelation 126, 133, 171
- Baden, Reich Chancellor Prinz Max von 155, 193
- Baghdad railway 120–121, 153, 155
- Balkan League 210
- Balkan, localized conflict in the 6, 107, 111, 205
- Bank note circulation 176–179
- Basel Stock Exchange, closure of 32
- Basel, trading place of 115
- Belgium 59, 61, 80, 100, 206, 208, 212
- Belgium, conquest of 89, 213
- Berlin Stock Exchange 14, 30–31, 97
 - Closure 32, 50, 106, 108, 109
 - Internationality 34
 - Market capitalization 33
 - Saling's Börsenpapiere 52, 73
 - Selected bond prices 88, 108–109

- Berlin, trading place of 11
- also cf. Berlin Stock Exchange
 - Grey market 15, 31, 50
- Bethmann-Hollweg, Reich Chancellor
Theodor von 150
- Beurs-Comité voor Publieke Fondsen 46
- Beurswet 95
- Bid-ask spread 69
- Bilateralism 1
- Blips, as opposed to structural breaks
184–186, 251
- Bonaparte, Napoléon 18
- Bosnia-Herzegovina 59, 61, 80, 100, 207
- Brazil 19, 52, 58–59, 61, 64–65, 75, 80, 96,
100, 206, 208, 210, 212, 220
- Brest Litovsk, peace negotiations at 72,
75, 114–115, 119, 148–149, 152, 169,
172, 193, 196–199, 236, 252
- Brusilov Offensive 147, 166, 169, 199
- Bulgaria 29, 35, 59, 61, 64, 80, 100, 103,
112, 155, 206, 216
- also cf. Central Powers
 - Alliance affiliation 112, 207, 210
 - Cointegration analysis of representative
bond 218–221, 229–230, 232
 - Cross-trading of representative bond
83–87
 - Declaration of war on Serbia 169
 - Defeat 117, 149, 171
 - Index of perception on 201
 - Resource base 212, 245
 - Struggle in the interior 153
 - Turning points analysis of represent-
ative bond 120, 123–129, 133–135,
163–165, 180, 184, 196–199, 251
 - War aims 164
- Capability aggregation, as aim of alliance
formation 209
- Capacity-to-pay 19
- Carson, Lord Edward, resignation of 157
- Casualties, civilian 1
- Casualties, military 1, 115–116
- Central Powers 28–29, 35, 61, 75, 112,
120–130, 216, 257–259
- Alliance's credibility 205–207
 - Alliance's degree of integration
245–246
 - Cointegration of related bonds
217–244
 - Comparative sovereign risk 77
 - Coverage regarding bond prices 60
 - Formation of 5, 209–210
 - Granger-causality 246–248
 - Growth of selected 3–4
 - Index of perception 200–203
 - Liquidity of related bonds 70–72
 - Market index 75–76
 - Resource base 6–7, 212
 - Strength 211–213
 - Turning points in related bonds
134–203, 251–255
- Cheap talk 27
- Chemin des Dames, Battle of 149
- Chile 59, 80, 100, 206
- China 36, 59, 61, 80, 100, 192, 206, 210,
212–213
- also cf. Allied Powers
 - Cointegration analysis of representative
bond 217–218, 222, 230–231, 247–248
- Circulation, of bank notes 176–179
- Clean price 49
- Closure, of stock exchanges 32
- Coefficient of correlation 79–80, 87, 121,
225–227, 234–237
- Coefficient of variation 133
- Cointegration analysis 30, 36
- Global test, methodology of 208,
215–217, 227–229
 - Global test, results of 230–234,
256–260
 - Near-integrated time series 232
 - Sub-periods test, methodology of
237–239
 - Sub-periods test, results of 240–244,
256–260
- Colombia 59, 64, 80, 100, 206
- Comparative sovereign risk 77
- Compiègne, Armistice of 75, 119, 127,
172, 186, 193, 195, 197, 227
- Composite Index of Material Capabilities
200–201, 211–213, 245
- Composition of traded securities,
Amsterdam Stock Exchange 52–55
- Compulsory military service, in Britain
144, 146, 256

- Conflict, Great Power 1, 5
- Conflict, localized 6, 107, 111, 205
- Congress of Vienna 2
- Conscription controversy, in Britain 114, 142–146, 153, 256
- Correlation coefficient, cf. coefficient of correlation
- Country indices, of bond prices 78, 81
- Coupon 20–21, 120
- Credibility spillover 216, 259
- Cross-trading, of bonds 81–89
- Cuba 59, 61, 64–65, 80, 100, 120, 206, 208
- Current yield 62–63, 105, 124, 185, 217, 260
 - Descriptive statistics 125, 219
 - For selected countries 128–132, 145, 151, 154–159, 161–162, 165, 167–168, 170, 206, 261
 - Market index 219
- Czech Republic, its proclamation of independence 169

- Daghandelaren 93
- Dardanelles 146
- Dawes-Plan 2
- De Telegraaf 47–48
- De Tijd: Godsdienstig-Staatskundig Dagblad 47–48, 161
- Declarations of war, sequence of 61
- Default premium 259
- Default risk 20–22, 45, 112, 120–124, 126, 141, 150, 184, 259
 - also cf. probabilities of default
- Denmark 59, 80, 100, 206
- Derby Scheme 146
- Descriptive statistics, of selected bond prices 125, 219–220
- Descriptive statistics, on entire database 62
- Dirty price 49
- Discount rate, cf. Time preference
- Dominican Republic 59, 64–65, 80, 100
- Don-Cossacks, uprising of the 162
- Dreadnought 6–7
- Dual Alliance 209–210
- Duration effects 62–63, 124–125, 129, 217
- Dutch East Indies 58–60, 80, 100, 206
- Dutch Economy 39–44
 - Banking system 98
 - Coal dependency on Germany 42–43
 - Economic growth 39–41, 46, 54
 - Economic relations with Germany 40, 42–43
 - Economic relations with United Kingdom 40, 42
 - Inflation 43–44, 176–179, 187–188
 - Pricing of government debt 43–44
 - Share in world exports 39–41
- Economic growth 2–6, 39–41
- Effectenboek 48
- Effectensocieteit opgericht door het Algemeen Beurs-Comité 46
- Effective transaction price 93–94
- Efficient market hypothesis 19, 21, 26
- Egypt 59, 61, 80, 100, 206
- Endogeneity 183
- England 6, 31, 35, 56, 60, 108, 115, 163
 - also cf. Allied Powers
 - also cf. London
 - also cf. London Stock Exchange
 - Alliance affiliation 112, 209–210
 - Asquith, Prime Minister Herbert Henry 146, 256
 - Allied naval blockade 5, 42, 52, 157, 192, 233
 - Bank note circulation 177, 183
 - Carson, Lord Edward, resignation of 157
 - Cointegration analysis of representative bond 217–222, 226–233, 236, 238, 243–248
 - Compulsory military service 144, 146, 256
 - Cross-trading of representative bond 83–89
 - Derby Scheme 146
 - Dreadnought 6–7
 - Economic growth 4, 39
 - Economic relations with Netherlands 40, 42
 - Gallipoli 146, 153
 - Hundred Days Offensive 72, 114, 149, 160, 169, 195, 197–199
 - Index of perception 201

- Jellicoe, Admiral John 192
- Jutland, Battle of 114, 119, 147, 160, 169, 192, 197
- Kitchener, Lord Herbert, head of British War Office 135, 147
- Lloyd George, David, head of Munitions Office 146
- Military casualties 115–116
- National Registration Act 146
- Pressure on Netherlands 32
- Pressure on press 141
- Resource base 7, 203, 218
- Trench warfare trap 233, 244, 249, 258
- Turning points analysis of representative bond 112, 120–122, 133, 136–137, 155–157, 161, 196–199
- War aims declaration 161
- War bonds 50–52, 58, 60, 120–123, 155–157, 161, 217–220, 222, 226, 229, 231, 236, 240–243
- Event analysis 23
 - also cf. Turning points analysis
 - Agnostic 24–26, 35, 37
 - Classical 24, 37
- Exchange rates 56–57, 73, 173–174, 179–183, 252
 - Determinant of bond prices 19, 173–174, 179–183
 - Measure of public opinion 90–91, 115
- Expectations, as embodied in bond prices 19–22, 26, 84, 106, 112, 124–126
- Expectations, as embodied in exchange rates 115

- Falkenhayn, Commander-in-Chief Erich von 89, 150
- Financial relationships, among the Great Powers 233–234, 246–248, 257–258
- Finland 59, 80, 100, 206
- Foch, Commander-in-Chief Ferdinand 153
- Food situation, in Germany 150, 157
- Fort Vaux 147, 169
- Fourteen Points, US President Wilson's 119, 193–197, 252
- France 1, 31, 35, 42, 56, 58–60, 80, 100, 114–115, 206
 - also cf. Allied Powers
 - also cf. Paris
 - also cf. Paris Stock Exchange
 - Alliance affiliation 5, 112, 209–210
 - Bank note circulation 178
 - Bonaparte, Napoléon 18
 - Cointegration analysis of representative bond 217–218, 223, 226–238, 240–248
 - Cross-trading of representative bond 83–89
 - Declared war aims 12
 - Economic growth of 4, 39
 - Foch, Commander-in-Chief Ferdinand 153
 - Fort Vaux 147, 169
 - Franco-Prussian War 18
 - Hundred Days Offensive 72, 114, 149, 160, 169, 195, 197–199
 - Index of perception 201–203
 - Napoleonic Wars 2, 18, 21
 - Proudhon, Pierre Joseph 18
 - Resource base 7, 212
 - Trench warfare trap 233, 244, 249, 258
 - Turning points analysis of representative bond 35, 120–133, 137, 143, 157–161, 180–181, 183, 196–199
 - Verdun, Battle of 72, 119, 147, 152–153, 158, 164, 169, 192, 197, 244
 - War bonds 50–51, 58, 60, 79, 120–123, 157–161, 217–226, 229–231, 236, 240, 260–261
- Franco-Prussian War 18
- Freedomhouse Index 200

- Gallipoli 146, 153
- GDP, cf. Economic growth
- Geneva Stock Exchange, closure of 32
- German Empire, cf. Germany
- Germany 1, 19, 31–35, 45, 56–59, 61, 64, 80, 100, 108, 206
 - also cf. Berlin
 - also cf. Berlin Stock Exchange
 - also cf. Central Powers
 - also cf. Prussia
 - Alliance affiliation 112, 209–210, 216
 - Allied naval blockade 5, 42, 52, 157, 192, 233
 - Attempt to win over Japan 152
 - Attempt to win over Mexico 152

- Authorities' view on Algemeen Handelsblad 141
- Baden, Reich Chancellor Prinz Max von 155, 193
- Bank note circulation 178
- Bethmann-Hollweg, Reich Chancellor Theodor von 150
- Blips analysis 185–194
- Brest Litovsk, peace negotiations at 72, 75, 114–115, 119, 148–149, 152, 169, 172, 193, 196–199, 236, 252
- Business's interest in a war 110
- Cointegration analysis of representative bond 217–221, 226, 229–248
- Cross-trading of representative bond 83–89
- Country index 81
- Dawes-Plan 2
- Declaration of war received from Italy 184
- Declared war aims 12
- Dutch coal dependency 42–43
- Economic growth of 4, 39
- Economic relations with Netherlands 40, 42–43
- Falkenhayn, Commander-in-Chief Erich von 89, 150
- Flight capital 99
- Food situation 150, 157
- German-Russian relations 192
- Grey market, in Berlin 15, 31, 50
- Hindenburg Line 149, 157, 160, 164
- Hundred Days Offensive 72, 114, 149, 160, 169, 195, 197–199
- James Gerrard, Ambassador to United States 192
- Index of perception 200–203
- Interwar period, research on history of 2, 23
- James Gerrard, Ambassador to United States 192
- Jutland, Battle of 114, 119, 147, 160, 169, 192, 197
- Ludendorff, Erich 194
- Marx, Karl 18
- Military casualties 115–116
- Moltke, Helmut von 89
- Oberste Heeresleitung 194
- Pressure on press 141
- Reinsurance Treaty with Russian 209–210
- Related turning points studies 114
- Resource base 6–7, 212
- Scheer, Admiral Reinhard 147
- Spring Offensive 77, 114, 119, 149, 160, 193, 197–198, 244
- Submarine warfare 5, 72, 89, 114, 147, 152–153, 157–158, 162, 187, 192, 197, 210, 233
- Subscription of war bonds 15–16
- Surface naval warfare 147, 160
- Sussex, Torpedoing of merchant vessel 153
- Tirpitz, Grand Admiral Alfred von 187
- Trench warfare trap 233, 244, 249, 258
- Turning points analysis of representative bond 120–123, 127–129, 135, 142–150, 180–181, 195–199, 251, 256
- Turnip Winter 152
- Ukraine, peace treaty with 157, 171
- Verdun, Battle of 72, 119, 147, 152–153, 158, 164, 169, 192, 197, 244
- War bonds, as a measure of public opinion 14–17
- War bonds, interest rate of 259
- War bonds, subscription results of 15–16
- War economy 182
- Wilhelm II, German Emperor, Abdication of throne 194
- Gerrard, Ambassador to Germany James 192
- Gids bij de Prijs-Courant 48, 66, 73
- Globalization, First Age of 2, 39, 110, 233
- Gold standard, suspension of 8, 90, 173
- Government bonds 9–10, 30, 32
 - also cf. Turning points analysis
 - Database on Amsterdam 47–66
 - Interpretation of their price 10, 19–23
 - Liquidity 69–71, 100–101, 134–139, 145, 151, 154, 156, 159, 162, 165, 167–168, 170
 - Market index 72–77
 - Measure of public opinion 10–11, 14–22, 106–111, 205–208

- Representative for sovereign issuers 78–81
- Selected prices 44, 79–80, 85–87, 100–101, 108–109, 120–132, 145, 151, 154–159, 161–162, 165, 167–168, 170, 175–177, 206, 217–225, 260–262
- Source of the historian 9–10, 14–22
- Granger-causality 246–248
- Great Depression 2, 5, 40
- Great Power conflict 1, 5, 107, 233
- Great Power status, definition of 209
- Greece 160, 164, 210
- Grey market, in Berlin 15, 31, 50
- Grey market, in Amsterdam 49–50, 121

- Habsburg Empire, dissolution of 1, 164
- Het Centrum 47–48
- Heteroscedasticity 126, 133, 171
- Hidden intentions 27
- Hindenburg Line 149, 157, 160, 164
- Hindsight bias 27
- Hoekmannen 93
- Holding period return 69
- Hope & Co 102
- Human Development Index 200
- Hundred Days Offensive 72, 114, 149, 160, 169, 195, 197–199
- Hungary 59, 80, 96, 100, 108, 115, 120, 206,
 - also cf. Austria
 - also cf. Central Powers
 - also cf. Habsburg Empire
 - Cross-trading of representative bond 83–89
 - Denouncement of real union with Austria 164
 - Peace offer to Allies 157

- Illiquidity 141
- Illusion, short-war 6, 8
- Industrialized war 1
- Inflation 19, 21, 176–179, 183
- Inflation expectations 21–22
- Instrumental variables regression 183
- Interest rates 22, 56–57, 112, 182–183, 200, 252, 259
 - also cf. Prolongatie koers
 - also cf. Time preference
 - Term structure of 62
- International financial center 10
 - Amsterdam 45–46, 99
 - Definition 46
 - London 45, 257
 - New York 45
- International financial system 110
- Internationality, of stock exchanges 34
- International system of alliances 5, 29, 107, 110
- Interpolation, of price series 68–69
- Investor perception, index of 199–203
- Investors, nature of 10–11, 96–103
- Iraq wars 37
- Israeli-Palestinian conflict 37
- Istanbul, as market place 106–107, 111, 114
- Istanbul Stock Exchange 31, 106
- Italy 35, 59, 61, 80, 100, 166, 206
 - also cf. Allied Powers
 - Alliance affiliation 112, 209–210, 214
 - Cointegration analysis of representative bond 218, 223, 229–231, 247–248
 - Cross-trading of representative bond 83
 - Declaration of war on Germany 184
 - Economic growth 4
 - Entry into war 89
 - Index of perception 201, 203
 - Resource base 212
 - Turning points analysis of representative bond 120–123, 133, 137–138, 144, 166–167, 196–199
- Japan 36, 59, 61, 75, 80, 88, 100, 152, 206, 212
 - also cf. Allied Powers
 - Alliance affiliation 121, 210
 - Cointegration analysis of representative bond 217–220, 223, 229–231
 - German attempt to form an alliance 152
 - War against Russia 37
- Jellicoe, Admiral John 192
- Johannesburg Stock Exchange 32–34
- Jutland, Battle of 114, 119, 147, 160, 169, 192, 197

- Kerensky, Alexander, leader of provisional government 157
- Kitchener, Lord Herbert, head of British War Office 135, 147
- Kut, First Battle of 152–153
- Leeuwarder Courant 47–48
- Liberia 59, 120, 208
- Liquidity 29, 35, 79, 133–139, 252, 260
- Determinant of a bond's representativeness 78–80, 120–123, 133, 218
 - Determinant of bond yields 172, 180–184
 - Distribution of bond-specific liquidity 79
 - Dutch capital market 98–99
 - Government bond market 70–72
 - Measurement 65–69
 - Nature of investors 99–103
 - Premium 69, 182
 - Rolling measure 142, 145, 151, 154, 156, 159, 162, 165, 167, 168, 170
- Lloyd George, David, head of Munitions Office 146
- Localized conflict, in the Balkan 6, 107, 111, 205
- London Stock Exchange 30, 73, 82–84
- Closure 31–32, 105, 108–109
 - Comparison with Amsterdam Stock Exchange 10
 - Internationality 34
 - Market capitalization 33
 - Price controls 45
 - Selected bond prices for 85–87, 108–109, 158, 260–262
 - Wartime regulation 45
 - World War One as a surprise for investors 106–111
- London, trading place of 11, 34–35, 52, 56–57, 81–84, 90–93, 147, 157, 205, 259
- also cf. London Stock Exchange
 - Acceptance business 99
- Loss of life, civilian 1
- Loss of life, military 1
- LOT-measure 69–70, 78, 80, 100
- Ludendorff, Erich 194
- Madrid Stock Exchange 32–33
- Market capitalization, of stock exchanges 33
- Market index 66
- Amsterdam Stock Exchange 73–77, 174–177, 182, 219
 - Amsterdam versus London 82
 - Construction 72–73
- Market integration 36, 44–45, 51, 84, 110, 208, 215, 217, 233
- Market liquidity 35, 66, 70–72, 112, 172, 182
- Marne, First Battle of the 89
- Marne, Second Battle of the 149, 164, 193
- Marx, Karl 18
- Mean reversion, cf. Stationarity
- Mentality 12, 105
- Mesopotamia 153, 155
- Mexico 59, 80, 100, 192, 206
- German attempt to form an alliance 152
- Middle price 48, 51, 93, 94, 95
- Military Service Act 144, 256
- Moltke, Helmut von 89
- Montenegro, Austrian advance against 163, 166, 186
- Morale 11
- Moving correlations 234–237
- Multicollinearity 183
- Municipal bonds, selected Dutch 175–177
- Napoleonic Wars 2, 18, 21
- National Registration Act 146
- National wealth, of the Dutch people 97–103
- Near-integrated time series 232
- Net body count 115–116, 161, 192
- Netherlands 10, 35, 39, 56, 58–59, 64, 80, 100, 206
- also cf. Amsterdam
 - also cf. Amsterdam Stock Exchange
 - also cf. Dutch economy
 - Bank note circulation 176–177
 - Coal dependency on Germany 42
 - Economic growth 41, 43
 - Economic relations to the UK and Germany 40, 42
 - Hope & Co 102
 - Inflation 43, 177, 183

- Neutrality of 32, 40, 42, 45, 89–90, 125–126
- Pricing of government debt 43–44
- Rotterdam as international financial center 10
- Safe haven for foreign capital 10, 72, 99
- Share in world exports 41
- Short-term lending to belligerents 42
- Suspension of gold standard 98
- War’s paradoxical effect 46
- Wealth holdings of population 97–103
- Neutrality, Dutch 32, 40, 42, 45, 89–90, 125–126
- Neutrality, Swiss 89
- Neutrality Treaty, Austrian-Russian 209
- Newspapers, Dutch 47
- New York, international financial center of 45
- New York Stock Exchange 32–34, 92
- Nicaragua 59
- Nieuwe Rotterdamsche Courant 47
- Nieuwsblad van het Noorden 47
- Nominal amount outstanding, of a bond 73, 82, 122
- Norway 59, 80, 100, 206

- Oberste Heeresleitung 194
- Officiele Prijscourant 47–49
- Opening hours, of Amsterdam Stock exchange 93–94
- Ottoman Empire, cf. Turkey
- Outbreak of the war 5
 - Archduke Ferdinand, assassination of 5, 110
 - Arms race 6, 106
 - In public opinion 105–111, 205–206
 - Resource base of belligerents 6–8, 211–213
 - Short-war illusion 6, 8
 - Theories about 6
 - War enthusiasm 8–9

- Panel cointegration 216
- Paris, as a trading place 11, 34–35, 45–46, 56–57, 83–84, 90–91, 107, 121, 161, 260–262
 - also cf. Paris Stock Exchange
- Paris Economic Conference 166, 187
- Paris Stock Exchange 31, 83, 111–112
 - Closure 32, 105, 108–109
 - Internationality 34
 - Market capitalization 33
 - Selected bond prices 85–87, 108–109, 261
- Patriotic bias 45
- Patriotism 16
- Peace negotiations at Brest-Litovsk, cf. Brest-Litovsk
- Perception, cf. Public opinion
- Piave, Battle of the 153, 171
- Polity IV Index 200
- Portfolio effects 174, 182
- Portugal 36, 59, 61, 64–65, 80, 100, 206 210, 212
 - also cf. Allied Powers
 - Cointegration analysis of representative bond 217–220, 224, 229, 231, 247
- Press, subject to censorship 141
- Prisoners of war 1, 115
- Probability of default 20–22, 150
- Prolongatiekoers 57, 172–173, 179, 182, 184
- Prolongatiekrediet 97–98
- Propaganda 11
- Protectionism 1, 2, 5, 40
- Protectionist policies, cf. Protectionism
- Proudhon, Pierre Joseph 18
- Prussia 18–19, 52, 58, 83–85, 88–89, 121
 - also cf. Central Powers
 - also cf. Germany
 - Austro-Prussian War 18
- Public debt 6–9, 19–22
- Public opinion 8–9, 36, 249
 - also cf. Cointegration analysis
 - also cf. Turning points analysis
 - Agnostic structural break approach, cf. Turning points analysis
 - Credibility of alliances 208, 214–217
 - Definition 11–13
 - Government bond prices as measure 10–11, 14–22, 106–111, 205–208
 - Net body count 161
 - Qualitative sources of the historian 13
 - Quantitative sources of the historian 14–22
 - Related research 9, 11–17, 36
- Public perception, cf. Public opinion

- Redemption, of a bond 19, 57, 62, 120, 122
- Reinsurance Treaty, Russian-German 209–210
- Representative bonds 78
- also cf. government bonds
 - Cointegration analysis 217–225
 - Concept 79–81
 - Turning points analysis 120–123
- Repudiation, of Tsarist bonds by Bolsheviks 112, 220, 262
- Resource base, of belligerents 6–8, 211–213
- Revolution, of 1848 18
- Revolution, Russian, of 1905 37
- Revolution, Russian, of 1917 37, 112, 114–115, 148, 155, 160, 162, 166, 169, 189
- Risk-free rate of return 77, 125
- Robustness, of the detected turning points 171–184
- Romania 35, 58–59, 61, 64–65, 80, 100, 103, 203, 206, 212–213, 259
- also cf. Allied Powers
 - Alliance affiliation 112, 210, 214
 - Central Powers' advance on Bucharest 155
 - Cointegration analysis of representative bond 218–220, 224, 229–231, 247–248
 - Cross-trading of representative bond 83–84
 - Declaration of war on Austria-Hungary 184
 - Defeat 75–76, 149, 157, 160, 166, 169, 200
 - Entry into war 119, 155
 - Index of perception 201
 - Turning points analysis of representative bond 120–121, 123, 127, 131, 133, 138, 168–169, 181, 196–198, 251
- Rotterdam, as international financial center 10
- Rotterdamsch Nieuwsblad 47
- Russia 35, 50, 56–59, 61, 64–65, 76, 79–80, 100, 103, 108–109, 206, 260–262
- also cf. Allied Powers
 - Ability-to-pay 163
 - Alliance affiliation 112, 209–210
 - Bank note circulation 178
 - Black Sea Fleet 146
 - Brusilov Offensive 147, 166, 169, 199
 - Cointegration analysis of representative bond 217–224, 226, 229–248
 - Cross-trading of representative bond 83–87
 - Defeat 75–77, 148–149, 160–161, 166, 171–172, 193, 197–198, 213
 - Don-Cossacks, uprising of the 162
 - Economic growth 4, 39
 - German-Russian relations 192
 - Index of perception 201–203
 - Kerensky, Alexander, leader of provisional government 157
 - Localized conflict in the Balkan, part of 107
 - Neutrality Treaty with Austria 209
 - Offensive on the Strypa and the Styr 146
 - Peace negotiations at Brest Litovsk 72, 75, 114–115, 119, 148–149, 152, 169, 172, 193, 196–199, 236, 252
 - Protective power in the Balkan 161
 - Railway network 163
 - Reinsurance Treaty with German 209–210
 - Repudiation of Tsarist bonds by Bolsheviks 112, 220, 262
 - Resource base 7, 212
 - Revolution of 1905 37
 - Revolution of 1917 37, 112, 114–115, 148, 155, 160, 162, 166, 169, 189
 - Russo-Japanese War 37
 - St. Petersburg Stock Exchange 32
 - Sykes-Picot Agreement 161
 - Trench warfare trap 233, 244, 249, 258
 - Turning points analysis of representative bond 120–123, 127, 130, 133, 138, 161–163, 180–184, 196–199
- Russian Empire, cf. Russia
- Russian Revolution 37, 112, 114–115, 148, 155, 160, 162, 166, 169, 189
- Russo-Japanese War 37
- Saling's Börsenpapiere 52, 73
- Scheer, Admiral Reinhard 147
- Selle, Battle of the 193

- Sentiment analysis 141
- Serbia 35, 59, 61, 80, 100, 103, 107–108, 112, 150, 206, 212
 - also cf. Allied Powers
 - Alliance affiliation 112, 210
 - Cointegration analysis of representative bond 217–220, 225, 229–231, 247–248
 - Cross-trading of representative bond 83, 87
 - Declaration of war received from Austria 205
 - Declaration of war received from Bulgaria 169
 - Defeat 150, 161, 163–164, 166, 213
 - Index of perception 201
 - Turning points analysis of representative bond 120–123, 127, 131, 133, 138–139, 169–171, 180–181, 196–198, 251
- Shifting mean regression 124, 171
- Short-term lending to belligerents, Dutch 42
- Short-war illusion 6, 8
- Sleepwalker hypothesis 106
- Somme, First Battle of the 147, 192
- Somme, Second Battle of the 193
- Sovereign bonds, cf. Government bonds
- Sovereign debt 9–10, 45, 92, 106, 126
 - also cf. Government bonds
 - also cf. Public debt
 - Crisis, European 259
 - Cross-holdings 233
 - Dutch 89
 - Probability of serving 19
 - Valuation 252
- Sovereign debt crisis, European 259
- Sovereign issuer, price observations on bonds by 58, 59
- Sovereign risk, comparative 77
- Spain 59, 80, 100, 206
- Spring Offensive, German 77, 114, 119, 149, 160, 193, 197–198, 244
- Stationarity, of a time series 133, 218, 227–229, 246
- Stock exchange 10
 - also cf. Amsterdam Stock Exchange
 - also cf. Basel Stock Exchange
 - also cf. Berlin Stock Exchange
 - also cf. Geneva Stock Exchange
 - also cf. Istanbul Stock Exchange
 - also cf. Johannesburg Stock Exchange
 - also cf. London Stock Exchange
 - also cf. Madrid Stock Exchange
 - also cf. New York Stock Exchange
 - also cf. Paris Stock Exchange
 - also cf. St. Petersburg Stock Exchange
 - also cf. Sydney Stock Exchange
 - also cf. Tokyo Stock Exchange
 - also cf. Toronto Stock Exchange
 - also cf. Vienna Stock Exchange
 - also cf. Zurich Stock Exchange
 - Closure during war 32
 - Internationality 34
 - Market capitalization 33
 - Trade restrictions 45, 95–96
- Stockholm Socialist Conference 157, 166
- Stocks 10, 31–32, 50, 53, 69
 - also cf. Portfolio effects
 - Measure of public opinion 22–23, 107
 - Part of Dutch national wealth 97
 - Selected Dutch 175–177
- St. Petersburg Stock Exchange 32
- Strypa and the Styr, Offensive on the 146
- Structural break analysis, cf. Turning points analysis
- Structural break approach, cf. Turning points analysis
- Structural break test, cf. Turning points analysis
- Submarine warfare 5, 72, 89, 114, 147, 152–153, 157–158, 162, 187, 192, 197, 210, 233
- Surface naval warfare 147, 160
 - also cf. Jutland, Battle of
- Surinam 58–60, 80, 100, 206
- Sussex, Torpedoing of merchant vessel 153
- Sweden 59, 64–65, 80, 100, 206
- Swiss bourses 91, 111
- Switzerland 59, 80, 89, 100, 115, 166, 192, 206
 - also cf. Zurich
 - also cf. Zurich Stock Exchange
 - Basel Stock Exchange, closure of 32
 - Basel, trading place of 115
 - Geneva Stock Exchange, closure of 32

- Sydney Stock Exchange 32–34
 Sykes-Picot Agreement 161
- Tannenberg, Battle of 89
 Term structure of interest rates 62
 Time preference 21–22, 35, 124, 173, 182
 Time series-cross section regression 179–181
 Timetable analysis 117–119, 194–199
 Tokyo Stock Exchange 32–34
 Toronto Stock Exchange 32–34
 Tirpitz, Grand Admiral Alfred von 187
 Trade restrictions 44–46, 84, 90, 95–96, 158, 187, 259
 Trading volume, of Amsterdam Stock Exchange 66–68
 Transaction costs 69
 Trench warfare 7, 193
 Trench warfare trap 233, 244, 249, 258
 Triple Alliance 209
 Triple Entente 157, 209–210
 Turkey 1, 29, 35, 59, 61, 64, 80, 100, 103, 106, 112, 115, 206, 245
 – also cf. Central Powers
 – also cf. Istanbul
 – also cf. Istanbul Stock Exchange
 – Alliance affiliation 29, 112, 210, 214
 – Baghdad railway 120–121, 153, 155
 – Balkan League 210
 – Balkan, struggling over control in the 207
 – Battle of Kut 152–153
 – Contegration analysis of representative bond 217–222, 229–231
 – Cross-trading of representative bond 83–86
 – Dardanelles 146
 – Economic growth 4, 39
 – Gallipoli 146, 153
 – Index of perception 201, 203
 – Mesopotamia 153, 155
 – Peace offer to allies 117
 – Resource base 7, 212
 – Sykes-Picot Agreement 161
 – Turning points analysis of representative bond 120–123, 127–129, 136, 143, 153–155, 180–181, 184, 196–198, 251
 – Turning points analysis 8, 28, 29
 – Blips, as opposed to turning points 184–186, 251
 – Blips in German bond 186–194,
 – Breaks in representative Austrian bond 134, 150–153
 – Breaks in representative Bulgarian bond 134–135, 163–165
 – Breaks in representative English bond 136–137, 155–157, 161
 – Breaks in representative German bond 135, 142–150
 – Breaks in representative French bond 137, 157–161
 – Breaks in representative Italian bond 137–138, 166–167
 – Breaks in representative Ottoman bond 136, 153–155
 – Breaks in representative Romanian bond 138, 168–169
 – Breaks in representative Russian bond 138, 161–163
 – Breaks in representative Serbian bond 138–139, 169–171
 – Index of investor perception 199–203
 – Logic 23–25, 30–31
 – Pros and cons 26–27
 – Related research on World War One 112–116
 – Robustness of the detected break dates 171–184
 – Severity of the breaks 142–144
 – Shifting mean regression 126, 171
 – Summary of results 250–255
 – Timetable analysis, idea of 117–119
 – Timetable analysis, results on 194–199
 Turnip Winter 152
- Ukraine, peace treaty with 157, 171
 United Kingdom 6, 34, 39–40, 45, 81–82, 125, 203, 213, 232
 – also cf. England
 United States 2, 18, 42, 59, 80, 100, 120, 206
 – also cf. New York
 – also cf. New York Stock Exchange
 – Economic growth 3, 39

- Entry into war 72, 114, 148, 152, 192, 197, 199, 244
- Resource base 212
- Wilson, President of the United States Woodrow 153, 162, 164, 193
- Wilson's Fourteen Points 119, 193–197, 252
- Unit root testing 133, 179, 227–230, 232
- Unofficial market, cf. Grey market
- Unrestricted submarine warfare, cf. Submarine warfare
- Uruguay 59, 80, 100, 206

- Venezuela 59, 80, 100, 206
- Venizelos, Eleftherios, government under 160, 164
- Verdun, Battle of 72, 119, 147, 152–153, 158, 164, 169, 192, 197, 244
- Vereeniging voor den Effectenhandel te Amsterdam 46–48, 67, 92–95, 98
- Vienna, Congress of 2
- Vienna Stock Exchange 30
 - Closure 32
 - Internationality 34
 - Market Capitalization 33
- Vienna, trading place of 45–46, 83
 - also cf. Vienna Stock Exchange
- Volatility, of bond prices 133–139

- War aims declaration, British 161
- War bonds 14, 114, 259
 - Austrian 96
 - English 50–51, 58, 60, 79, 120–123, 155–157, 161, 217–220, 222, 226, 229, 231, 236, 240–243
 - French 50–51, 58, 60, 79, 120–123, 157–161, 217–223, 226, 229–231, 236, 240–243, 260–261
 - Measure of public opinion 14–17
 - Ottoman 114
 - Subscription of German 15–16
- War economy, functioning 8
- War economy, suspension of gold standard 8
- War enthusiasm 8
- War fever, cf. War enthusiasm
- War finance 14–16
- War of attrition 7
- Warfare 1
 - also cf. Submarine warfare
 - also cf. Surface naval warfare
 - also cf. Trench warfare
 - also cf. War of attrition
- Wilhelm II, German Emperor, Abdication of throne 194
- Willingness-to-pay 19, 21, 162
- Wilson, President of the United States Woodrow 153, 162, 164, 193
- Wilson's Fourteen Points 119, 193–197, 252
- World export volume 4–5, 40
- World financial center, London as 45
- World financial center, New York as 45
- World War Two 2, 17, 37, 40, 112

- Yield spread 217, 221–225, 227–229, 234, 246, 260–262
- Yield-to-maturity, concept of 63, 105, 124, 160–161
- Yield-to-maturity, in turning points analysis 132, 160–161
- Yugoslavia, its proclamation of independence 169

- Zero-coupon bond 20
- Zurich Stock Exchange 32–34
- Zurich, trading place of 32, 34, 46, 90, 111
 - also cf. Zurich Stock Exchange

