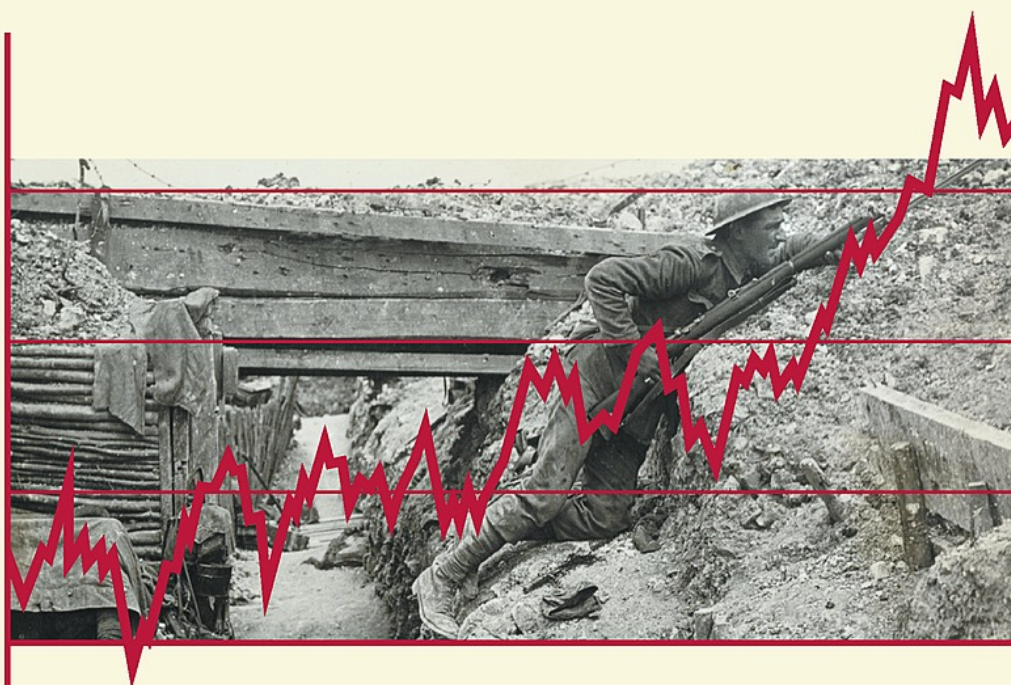


Tobias A. Jopp

War, Bond Prices, and Public Opinion



Economy and History 2

Mohr Siebeck

ECONOMY AND HISTORY

edited by

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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

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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.

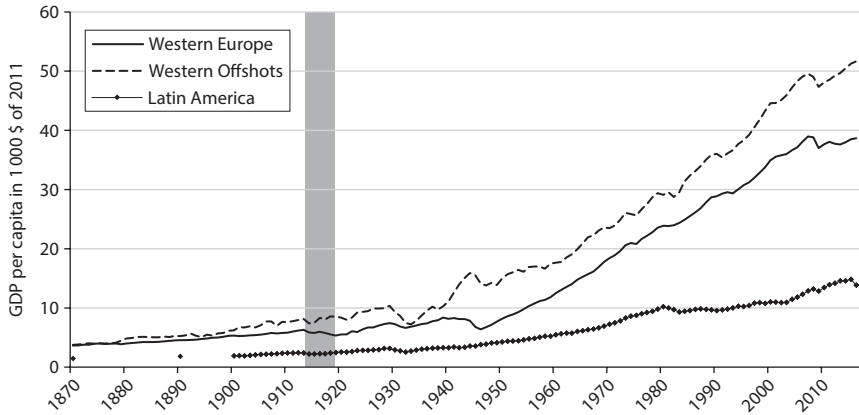
of the usual picture. It is certainly debatable whether commodity and financial markets saw the same degree of protectionism. From the angle of interwar German economic history, the fact alone that a considerable amount of foreign, and especially US-American capital flowed into the country after the 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).

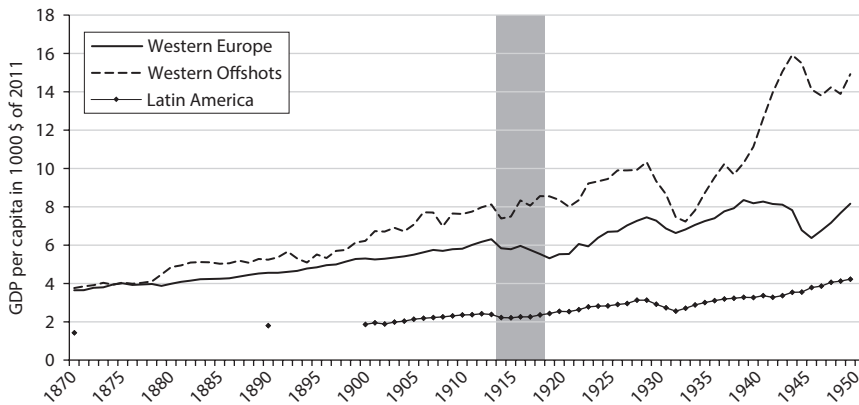
⁶ Economic historians tend to locate the beginning of globalization at around 1820. The main argument is that since then, in the aftermath of the Napoleonic Wars and the Congress of Vienna, we observe what economic historians say is the essence of globalization (as a process, not as a state), namely 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



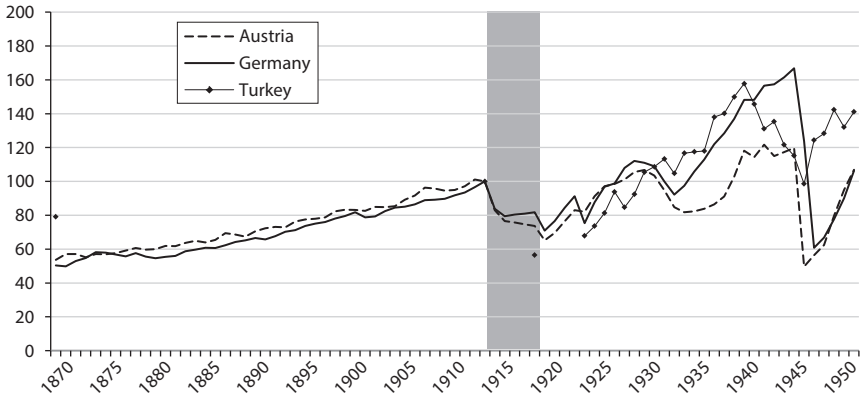
Sources: Maddison database available at <https://www.rug.nl/ggdc/historicaldevelopment/maddison/releases/maddison-project-database-2018>, as updated and described by Bolt et al. (2018); accessed: 3 May 2019.

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

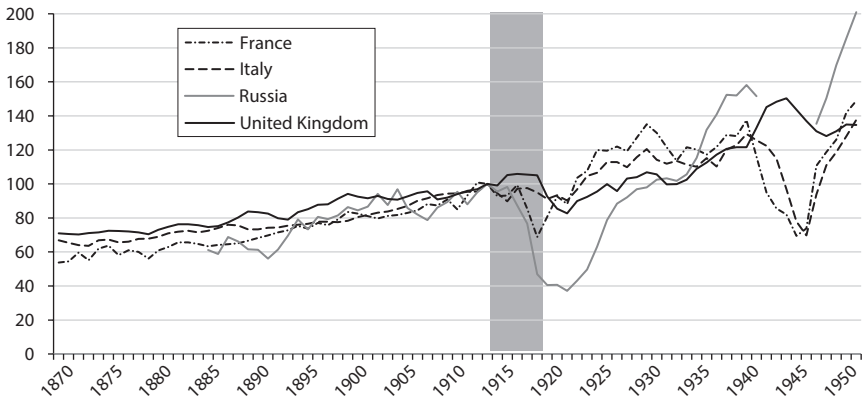
Figure 2 details the picture emerging for selected European countries. Panel (a) illustrates the fundamental break in the trend of economic growth coinciding with World War One for selected Central Powers, and panel (b) does so for selected Allied Powers. Turning to the upper panel first, the graphs 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.

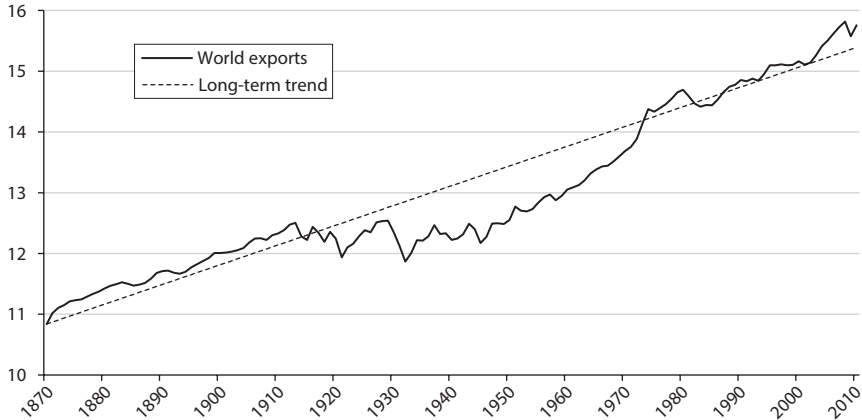
Using recent data provided by David S. Jacks and John P. Tang, Figure 3 shows World War One's effect on world export volume.⁸ In the short term, world

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), Düllfer/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).

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