

War and Creativity: Solving the War-Art Puzzle for Classical Music Composition

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Abstract (87 words)

The relationship between conflict and artistic output is ambiguous. This paper proposes an explanation for the contradiction in research, which we term the *war-art puzzle*. We employ a global sample of 115 prominent classical composers born after 1800 and link their annual productivity with the incidence of wars. We construct age-productivity profiles and find that the impact of wars on creative production is markedly heterogeneous - composers' productivity was significantly higher during defensive or victorious international wars and lower during intra-state conflicts, offensive or lost international wars.

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There is something suspicious about music, gentlemen. I insist that she is, by her nature, equivocal. I shall not be going too far in saying at once that she is politically suspect. - Herr Settembrini, ch. 4

(Thomas Mann, *The Magic Mountain*, Fischer, 1924)

1. Introduction

What is the relationship between war and artistic creativity? How does conflict affect the emergence of great artists and masterpieces? In a variety of forms and contexts, this question has long intrigued numerous social scientists from various academic disciplines. Historians seem to be unified in the argument that war is destructive and detrimental to the creative process itself. For decades distinguished scholars have not found any significant negative impact of war on arts or on the number of great artists. On the contrary, some studies revealed a positive impact of conflict on arts and artists. The ambiguous and counterintuitive relationship between war and arts that was found in previous research, I propose to term the *war-art puzzle*.

In this study we focus on important classical composers and attempt to explain the *war-art puzzle*. We briefly discuss exemplary cases and argue that certain types of war served as an inspiration for numerous masterpieces (*push-effect*) and that the topic of war often finds a broad audience (*pull-effect*). The main contribution of this paper however is an econometric analysis of a varying relationship between war and composer's artistic output when differentiations between various types, initiations, outcomes or geographic extent of wars are conducted. For this study, a unique data set that covers migration patterns, extracted from music dictionaries, and artistic output of prominent classical music composers, is linked with the incidence of war as recorded in the Correlates of War data set (Sarkees, 2000). The database encompasses a global sample of 115 important composers born between 1800 and 1950.³

We construct age-productivity profiles, to adjust for age effects, and find that composers' output is significantly higher during defensive, or not lost inter-state conflicts and that it is significantly lower during civil wars or offensive international wars. This paper demonstrates that exogenous conditions – the presence of peace or incidence of wars - have an important influence on composers' productivity, especially when account is taken of various kinds of war.

³ With each further reference to *composers* we mean *prominent composers* who are the focus of this study.

This work apart from providing an important contribution to the understanding of the relationship between historical wars and creative production, relates to a series of papers on the productivity of modern visual artists. Galenson (2000) and Galenson and Weinberg (2000 and 2001) demonstrated that artists born before 1920 were likely to have produced their most valuable work late in their careers, whereas artists born in the 1920s and 1930s were more likely to have done their most valuable work at an early age. The authors argue that the decline observed in the peak age over time was caused by a shift in the nature of the demand for contemporary art. Ginsburgh and Weyers (2006) do not accept the last conclusion and claim the importance of exogenous shocks such as World War II.⁴ This paper provides support for the Ginsburgh and Weyers' argument.

The remainder of this paper is organized as follows. In the next section, we provide an overview of the two contradictory strands in the literature. In the third section, we propose an explanation of the observed contradictions. In the fourth section, we describe the data. In the fifth section, we present and discuss our main findings, and in the last section we provide concluding remarks.

2. Contradictions in qualitative and quantitative Research

Several distinguished scholars provide qualitative discussions of history and claim that war and internal unrest have a negative impact on artistic creativity and artists. Toynbee (1972) studies the rise and fall of 23 civilizations and describes how the suppression of conflict enables the flourishing of arts and great cultures. Only peace and the absence of internal frontiers enable circulation of ideas and discoveries, whereas military history provides a continuing illustration of the “disastrous effects of relying on an old-fashioned technique instead of pressing on to meet the future with creative innovations.” Wright (1942) provides a thorough study of the institution of war, historically, legally and culturally, and concludes “war in itself has never constructed (...) cultural institutions or practises, and it has often destroyed old organizations and customs.” The destructiveness of military conflict is also argued by Sorokin (1937), where internal disturbances and wars were defined as the sharpest forms of disorganization of a system of social relationships; a society without balanced fundamental norms and values cannot raise its own

⁴ The age-price profiles presented (Galenson and Weinberg 2000, p. 772) indicate a marked increase in the quality of work that begins during the 1930s and 1940s. Moreover, the figures suggest that artists who during their career have experienced the Second World War produced paintings of a higher value.

culture or create arts. Simonton (1975) focuses in a broad sense on supply-side aspects and speculates that, in times of war, investment of time, capital and labour might be switched from any activity not directly related to national defence or aggression. Expanding the argument proposed for demand-side considerations, it could be expected that in times of war when the fulfilment of basic needs is endangered or not satisfied, the demand for arts and cultural goods presumably falls and hence the incentives for artistic output decrease.

In recent decades social scientists however have not succeeded in establishing the negative impact of conflict on artistic creativity and number of great artists; despite having used a variety of databases and followed different methodological approaches. Simonton (1975) studies the impact of war on creativeness of Western Civilization from 700 B.C. to 1839 A.D. His sample consists of approximately 5,000 creative individuals, grouped in 127 generations, cited in an international collection of about 50 histories, anthologies, and biographical dictionaries. The war variable was defined as the number of war years within each generation and the hypothesis analyzed, that the number of creators in one generation is a negative function of the number of wars, was rejected. In a later study, Simonton (1976) studied the correlations between imperial instability (i.e. number of revolts and rebellions in the context of large empire states) and discursive creativity in the field of science, philosophy, literature and classical music. All observations were allotted to 122 generations covering the time period from 540 B.C. to 1900 A.D. The estimated coefficients were found to be positive and indicate that a higher number of creators existed in times of imperial instability – a tentative indication of a positive impact of war on creativity. More recently, Murray (2003) investigates the impact of war and internal unrest on the number of important European visual artists, writers, composers and scientists. These individuals are grouped by generation and the data set covers the period from 1400 to 1950. In a restricted regression, the variables that characterize war and social unrest had no significant effect on the number of important figures in a generation. The employment of an expanded model, when several other explanatory and control variables are included, suggests that the impact of war on human accomplishment is positive and highly significant. Hellmanzik (2010) studied clustering premiums for visual artists and regressed prices of paintings on artist's age and several control variables, including dummies for both World Wars. The results indicate that artworks painted during World War I and World War II are valued higher by 6.1 per cent or 47.8 per cent, respectively. This finding is even more interesting as the war-premiums exceed on

average the estimated cluster premiums.

Are the historians wrong in their claims concerning the destructiveness of war with regard to arts and culture? If not, why was no support found in the data? In the following section we provide efforts to explain the observed ambiguity, termed as noted earlier the *war-art puzzle*.⁵

3. Solution of the War-Art Puzzle

Why does the *war-art puzzle* exist? The answer might be twofold. First, it lies in the fact that some types of war often served as an important stimulus for masterpieces, i.e. conflict had a *push-effect* for arts. Artists were inspired during times of war, which resulted in great artworks that bestowed on them the status of one of “the most prominent” artists. Second, art inspired by war usually deals with the topic of war and this subject has broad appeal. War admirers find exciting the thrill connected to victories and the sheer exercise of power, whereas pacifists appraise the symbolic value of the disastrous and tragic events of military conflicts.⁶

Let us consider two examples. First, “Wellington’s Victory” - an orchestral work that was composed in 1813 by Ludwig van Beethoven to commemorate the Duke of Wellington’s victory over Joseph Bonaparte’s forces at the Battle of Vitoria in Spain. The bombastic piece, with its fanfares, cannonades and themes from British patriotic songs was thunderously acclaimed, especially by the English audience. Critics regard the composition to be “tailored for popular success”, one of the first mass productions that appeared at the “dawn of the age [of] modern commercial propaganda” (Kinderman, 2009). A second influential composition, “Symphony No. 7” (also “Leningrad Symphony”) was composed by Dimitri Shostakovich within a month after the Nazis invaded Russia in the year 1941. The composer described the work to be “about terror, slavery, and oppression of the spirit” and the composition became an icon of the resistance, suffering and hopes of the Russian people. Shostakovich’s masterpiece received hundreds of performances, both in Russia and abroad.

The two examples presented are influential compositions that were written under the influence of a victorious or a defensive war. Other types of war might have had a negative impact on composition. Possibly, if some wars would not have occurred, the classical music

⁵ The arguments, examples and findings presented throughout the paper should however under no circumstances be understood as an argument in favour of wars.

⁶ If the number of contemporaneous war-related movies is any indicator, it can be concluded that this *pull-effect* still exists nowadays.

canon might include some additional great compositions. Would Richard Wagner's leaving have been richer if he had not emigrated because of a civil war - the May Uprising of 1849 - from Dresden to an exile in Zurich, where he spent 12-years in isolation from the German musical environment and lived mostly without any notable income? How would the career of Carl Orff have developed if he were not drafted into the army in 1917, when he got severely wounded at the front and almost died due to his injuries? We will never know the answers to these specific questions. We can however employ a bigger sample of composers and use econometric methods in order to investigate the average relationship between composers' productivity and various types of war.

4. The Data

This study builds upon a unique data set that covers a global sample of 115 prominent classical composers born between 1800 and 1949. The selection of the birth period is done for several reasons. First, data on the lives of composers are available and are relatively reliable, as opposed to, for example, composers of earlier periods. Second, the period chosen covers only deceased composers, and hence an analysis of a whole life output becomes possible. Third, the period encompasses many of the most influential composers of all time. Fourth, it covers wars that significantly shaped most recent history. Fifth, the geographic spread of births is fairly wide and composers' migration intensity is relatively high and hence a study of various types of war in a number of countries becomes possible.

The sampling technique aims at assuring maximum objectivity and reliability. The names of the most important composers are taken from Murray (2003). Murray's work is based on numerous international references and hence the risk of country- or marketing-biases in the selection is negligible. Data on composers' artistic output is taken from Gilder and Port (1978) which provides a qualitative selection of the most important works for 275 prominent classical composers born between 1500 and 1949. Gilder and Port aim to provide a dictionary "of lasting value as a permanent reference (...) [that contains] (...) complete factual information about who wrote what, and when" (Gilder and Port, 1978, preface). The dictionary is a recognized survey of the most influential classical compositions and served often as a source for composer's output (e.g. Simonton, 1991). Furthermore, if we combine both sources (i.e. Gilder and Port, 1978, and

Murray, 2003) for the period analyzed a relatively high intersection of 115 composers emerges.⁷

For those composers we extract the birth locations and detailed information on their migration patterns from the *Grove Music Online* (2009), the leading online source for music research, as claimed by the authors of the dictionary. This large multivolume dictionary is “a critically organized repository of historically significant information” (Grove, 2009, Preface) and is detailed enough to track the movements of all 115 composers.

What results is a unique data series that records the country of residence for each composer in every year of his life.⁸ In this study we focus only on the periods of a composer’s life when music-related work was predominant, i.e. when a composer was composing, giving tours, conducting philharmonics, teaching at music schools, managing music institutions, or travelling in search of inspiration. The aim of this restriction is to analyze the life period in which an individual from the sample was in fact a composer. Hence the infancy, education and retirement life periods are excluded as well as periods in which only other professions were practised.

The war data set is based on the *Correlates of War* (COW), a reliable database introduced and described by Sarkees (2000). The COW data set identifies conflicts within states and between states that occurred between 1816 and 1997⁹, and lists a number of records for each war. The available information enables us to take account of war heterogeneity and to conduct distinctions between various types of war. First, we will differentiate between civil wars (*intra-state wars*) and international wars (*inter-state wars*). Second, the inter-state wars will be divided into *defensive* and *offensive inter-state wars*, based on the record whether a participating state has initiated an international war. Third, a division of wars will be conducted with regard to its *outcome*. The COW data set provides records whether an inter-state war participant was on the winning side, losing side or whether a tie resulted. Fourth, we differentiate between *continental wars*, i.e. wars that occurred on the continent of the participating country, and *colonial wars*, i.e. wars that occurred only on a continent different to that of the participant’s continent. The composer and war data sets are linked through the country where a composer was located in a

⁷ Note that with each reference to composer, we mean, *prominent* composer, the focus of this study.

⁸ As our study encompasses only male composers, we use the male form.

⁹ The COW database covers also extra-state wars, i.e. wars between a state and a non-state entity. However, as none of these wars occurred within the boundaries of any of the countries analyzed, we do not include extra-state wars in our study.

given year.¹⁰

Composers who are included in this study are listed along with relevant background information in Appendix 1 and we present a summary of the data in Table 1. The data set encompasses composers who were engaged in music-related work during most of their lives (around 46 out of 68 years). France and the Germanic countries (i.e. Germany, Austria, Switzerland) accounted for the highest share of births of important composers – approximately 20 per cent each, followed by Russia with 14 per cent of births, Italy and Eastern European countries each with around 10 per cent of births.¹¹ One third of the composers were born in the first half of the 19th century, around 58 per cent were born in the second part of the 19th century and the remaining artists were born in the early 20th century.

Most of the important compositions are concert works (0.42 works per year), followed by chamber works (0.17 works per year) and theater works (0.13 works per year), while church compositions play only a marginal role (0.016 works per year). On average the total yearly output is equal to 0.73 and suggests that an artist during his career was composing two important classical works in less than three years.

The average composer was located in a country that has been engaged during 1.1 years in intra-state wars and around 8.2 years in inter-state wars. The duration of defensive and offensive international conflict faced by the country of composers' residence was approximately 4.9 and 3.4 years, respectively. The wars in which composers' country of residence was victorious or that ended with a tie lasted 2.5 years and the conflicts lost had a duration of 5.8 years. The wars analyzed were fought either on the continent of the participating country (2.4 years) or on other continents (5.8 years).

In Table 2 we summarize composers' annual creative production outcomes, measured as the number of written works, for the entire lifetime as well as for the periods when a certain type of war lasted. In the third column we present the differences between the average lifetime production and the observed productivity during each type of war. We find here a first indication for marked differences in artistic production depending on the presence of peace or war. Composers were significantly less productive during intra-state wars as well as offensive and lost

¹⁰ Note that for 1816-1918 (for the duration of the Austria-Hungary Union) the COW database aggregates wars in Austria and Hungary. To maintain consistency we also aggregate composers in that two countries for that time period. In analogy to the COW records we also aggregate composers for Germany and Italy for the period before the unification in 1871 and during the XIX century, respectively.

¹¹ See Table 1 for details on grouping of countries.

inter-state wars. We also observe that international defensive or not lost conflicts correspond with a significantly higher creative production.

5. Empirics

5.1 Model Specification

The aim of the econometric analysis is to provide a robust comparison of composers' lifetime productivity in times of peace and during certain types of war. The methodological approach resembles the identification strategy of Galenson and Weinberg (2000 and 2001) which we extended and apply in a very different context and apply to composers, as opposed to visual artists. Based on point estimates we generate age-productivity profiles for composers that have experienced peace or a certain type of war in a given year during their careers.

We estimate therefore a regression in which the number of important compositions written in one year is expressed as a polynomial in the age of the composer, interacted with war dummies. The causal relationship between creativity and war seems to be clear: war influences artistic output, not the other way round; therefore reverse causality is not an issue.¹² The regression contains also a number of control variables. Taking account of varying levels of productivity of different composers and of the fact that they might react in different ways to the incidence of a conflict, we include controls for each individual composer. The analysis stretches over a long time period in which composers' working conditions might have substantially changed over time. In order to capture this temporal variation we introduce binary variables for the year a work was composed. As different working conditions might have also existed between countries, we include a binary country control.¹³

Formally, the specification is given by:

¹² Note that the impact might not be direct and some transmission mechanism could be involved, for example the negative effect of conflict on composers' productivity might work through a decrease in wealth.

¹³ Note that with the introduction of the controls described we address also the problem of hidden co-linearity. This issue would be negligible if wars were fully exogenous incidences. Conflicts however might be attributable to determinants from within the system, i.e. to variables that impact also artistic output. For example, bad economic conditions might have impacted the incidence of a war and might also correlate with the level of creative production. As an additional control we have tried to include country-specific time trends (i.e. binary variables for a country *and* decade, or country *and* quarter-century) and found consistent results (not reported).

$$\begin{aligned}
composition_{it} = & (\beta_1 age_{it} + \beta_2 age_{it}^2 + \beta_3 age_{it}^3 + \beta_4 age_{it}^4)(peace_{it} + \sum_{k=1}^K war_{kit}) + \\
& + \sum_{l=1}^{115} \psi_l I(i=l) + \sum_{m=1824}^{1992} \rho_m I(t=m) + \sum_{n=1}^{24} \mu_n I(country_{it}=n) + u_{it},
\end{aligned} \tag{1}$$

where $composition_{it}$ denotes the number of important works written by composer i in year t and age_{it} indicates the age of composer i in year t ; $peace_{it}$ is a binary variable equal to one if the country of residence of composer i was not engaged in war in the year t ; war_{kit} is an indicator function that is equal to one for the type of war to be considered k that occurred in the country of residence of composer i in year t ; Ψ_l indicates a set of dummy variables for individual composers ($I(i=l)$ is an indicator function equal to one if $i=l$); ρ_m denote a set of controls for each year and μ_n a set of control variables for each country ($I(t=m)$ is equal to one if the considered annual productivity occurred in the year m and $I(country_{it}=n)$ is equal to one if the considered annual productivity was written in country n). This methodology bears some similarity to the way Galenson and Weinberg (2000 and 2001) calculated cohort effects, whereas here we interact the age effect with the incidence of war rather than a cohort indicator.

Several remarks are in order. First, the estimations are conducted with a fourth-order polynomial in the composer's age. We have chosen the degree based on a test for the significance of higher-order terms.¹⁴ The beneficial implication of the fourth-order polynomial is that it allows for single- and double-peaked career cycles. Second, the war variable will vary depending on the criteria of war segmentation imposed. All wars will be partitioned into intra-state and inter-state wars. Furthermore, we will take account of the heterogeneous nature of inter-state wars and will differentiate the international wars based on the initiation (defensive or offensive wars), outcome (lost or not lost wars) and geographic extent (continental or colonial wars). Third, in the model proposed we treat all types of classical compositions as equal. To take account of the heterogeneity of the dependent variable we conduct in the robustness analysis section out-of-sample estimations where the dependent variable is a specific type of classical work (e.g. *concertwork_{ij}*, *chamberwork_{ij}*) and find similar results. We complement this

¹⁴ The fourth-order polynomial was chosen by including fifth-order terms in age and testing for their joint significance. An F -test of the hypothesis that the fifth-order terms were jointly zero yielded a p -value of 0.818. The p -value for the F -test that the fourth-order terms were jointly zero was 0.028. Employing a third- or fifth-order polynomial yields comparable results. The results are consistent for all specifications discussed in this paper.

robustness analysis by the inclusion of a dummy for the city where the work was composed.¹⁵ Fourth, to estimate the proposed model we will use ordinary least squares regression techniques. This is justified by two assumptions. First we assume no jumps between consecutive observations, i.e. the distance between the *composition_{it}* variable being equal to, for example, 0 and 1 is assumed to be the same as the distance between 1 and 2.¹⁶ Second we assume that composers' preference for composing was always non-negative; as the underlying sample consists of the most important composers who devoted their lives to classical music, this assumption seems valid. As a result the dependent variable reflects real behaviour and is not "zero inflated". It is also not restricted upwards, for example, by a maximum value, as there are not any constraints imposed on composers' behaviour.

5.2 Econometric Results

We first divide all wars into intra-state and inter-state wars and report the estimated coefficients in Table 3. The age polynomials are estimated precisely and the models fit the data well. The regression estimates for all specifications are quite similar and provide consistent results, so we focus on those from the first specification.¹⁷ Figure 1 plots the age-productivity profiles for years of peace and for periods of intra- or inter-state wars. Composers' productivity in times of peace increases up to the mid-30s before declining; the implied peak occurs at 34.9 years. The age-productivity profile in times of intra-state wars stops increasing at 31 years and it lies significantly below the productivity level corresponding with periods of peace for composers' entire lifetime.¹⁸ Productivity during inter-state wars is statistically indifferent at the 5 percent level from peaceful times.¹⁹

¹⁵ The specific local demand and cultural infrastructure could lead, for example, to the composition of predominantly chamber works in Vienna, concert works in London or theater works in Italian cities. Note that composers also often specialised in a certain type of composition (e.g. Georges Bizet in opera works), hence including composer fixed effects already takes account to some extent of the heterogeneity of compositions.

¹⁶ As a robustness test we estimate the dependent variable in logs and find similar results (not reported). As the *compositions* variable does not have any marked outliers (the range is from 0 to 10) we leave it in levels in order to simplify the interpretation of the results.

¹⁷ Note that with the specifications in Column 2 or 3 we find minor differences in peak ages, which nevertheless are not of prime interest in this study, and, as the controls included vary over composers life-time (i.e. year, country or location controls), the age-productivity profiles contain more noise. The significance, size and direction of the differences in productivity remain however consistent (also throughout all models from Table 3).

¹⁸ The findings are similar for intra-state wars that were won by the governmental forces. There are not enough observations to conduct a reliable analysis of intra-state wars won by the opposition.

¹⁹ The *p*-value for the *t*-test that the productivity is higher in times of inter-state wars than in times of peace was above 0.057.

Second we sort international wars by their initiation and report the regression estimates in Column 1-3, Table 4. Figure 2 (based on the model from Column 1, Table 4), plots the age-productivity profiles for times of peace and for the duration of defensive or offensive inter-state wars. The plot indicates that during defensive wars composers were significantly more productive and peaked at 31.6 years (i.e. 3.3 years earlier than during peaceful times). The number of compositions written during offensive wars is significantly lower than during years of peace. The differences are particularly marked for younger composers and seem to converge for artists in their 50s and older.

Next we differentiate between various outcomes of international wars and plot in Figure 3 the corresponding age-productivity profiles (based on estimates from Column 4, Table 4). The results imply significantly higher productivity rates during wars that ended with victory or tie; the maximum occurs relatively early at 31.1 years. The estimated productivity during lost wars is significantly lower, independent of composers' age and peaks late at 38.4 years.

And finally we present in Columns 7-9 of Table 4 the estimations when international wars are sorted by their geographic extent into continental or colonial conflicts. Figure 4 (based on the model from Column 7, Table 4) depicts considerably higher productivity during times of continental wars, despite a temporary convergence during composers' early 50s. Productivity rates during colonial wars however are found to be only marginally lower.

5.3 Robustness Analysis

We first take account of the fact that classical works are not homogeneous. Different types of compositions might require for example various production times or access to different cultural infrastructure and hence could potentially disclose a different relationship with the incidence of war. We use an objective criterion and categorize all works into concert, chamber, theater and church works, judging on the type of composition as listed in Table A1. We then re-estimate all age-productivity profiles separately for each category of work and present the results in Figures A1.1 to A1.4.²⁰ The findings are consistent for concert and chamber pieces as well as mostly for church works – the composition intensity of these three types of works during peace and war

²⁰ Note that the imposed sorting criteria lead to a loss of many observations and the generated age-productivity profiles are based on a lower number of point-estimates. As a result the productivity profiles contain more noise and sometimes are estimated to lie in the negative area. Moreover, no church work was written in times of intra-state wars, and hence no profile can be constructed for this category of composition and war.

correspond with the patterns for the aggregated output variable. The differences in the composition intensity of theater works in times of peace and war are almost invisible and mostly statistically insignificant. A possible explanation could be the fact that it requires usually much longer production times for theater works which could lead to the diminishment of an immediate effect.

Next we study the persistency of the war influence and construct age-productivity for t years after the war has ended. The figures depicting composers' productivity 2 years after the war are presented in Figure A2.1 and imply a general convergence of the productivity functions. The convergence is mostly lagged for offensive and colonial inter-state wars: composers' productivity is even lower 1 or 2 years after these types of wars have finished. Within a period of 5 years however all differences lose their significance and the productivity levels during times of war and peace remain statistically undistinguishable. As the impact of war is statistically unobservable a few years after the war, the results of this robustness test provide further indication that it is the impact of wars on creative production we are measuring in the main part and that the incidence of conflict is the reason for the observed differences in the age-productivity profiles.

Further we investigate whether the war-impact differs for composers located in their mother countries and abroad. Table A3 visualises the remarkable migration intensity of composers: 77 per cent of the artists have been engaged during their lives in a music-related activity abroad and have spent on average almost one fourth of their careers abroad. We can however also observe that only a marginal part of the time spent abroad occurred when the host country was engaged in war. The final observation is consistent with the findings of Borowiecki (2010) which indicates a strong negative relationship between the incidence of war and composers' choice of residence country – artists were found to be avoiding regions engaged in warfare. As a result for our estimations – the war-productivity relationship found is almost entirely based on composers working in their mother countries and hence their productivity levels should be indistinguishable from the productivities of the entire sample. Figure A3.1 provides support for our expectation. The only exception appears for lost inter-state wars, during which creative productivity does not decrease for composers located in their mother countries and the lower artistic output observed is driven presumably by productivity decreases experienced by immigrant composers.

The sample size of composers living abroad in a country engaged in warfare is in general too small in order to estimate reliably age-productivity profiles for immigrant artists. We however hazard generating productivity functions for the case of defensive inter-state wars as we believe there might exist critical differences in the impact of defensive wars depending whether the composer is located in his country of birth or abroad. It is quite likely that one of the drivers of higher productivities in times of defensive wars is a patriotic motive. One would expect this channel however to work only for composers located in their mother country and not for immigrants. Figure A3.2 depicts the levels of creative production for composers located in their mother country and abroad. It can be concluded that productivity only of home composers increases during defensive wars while no statistically significant differences can be found for immigrant composers.²¹

Finally one might suspect that the results are driven by extreme observations, for example, by exceptionally productive composers. The bias would be present if wars were not evenly spread across all composers and if the most productive artists experienced more wars than the average creative individual. We investigate this possibility by dropping the most productive 10 per cent of composers and then reconstructing the age-productivity profiles for the remaining individuals. The results as presented in Figure A4 indicate robustness of the main findings.²²

6. Conclusion

This work aims to contribute to the overall understanding of the relationship between war and creative production, based on the example of classical composers. We propose an explanation, supported by two brief case studies, for the ambiguity of previous research. Based on a novel database we construct age-productivity profiles for periods of peace and various types of war for a global sample of 115 prominent composers born between 1800 and 1949. We find that international wars which ended with a victory or a tie, as well as defensive or continental inter-state wars, correspond with significantly higher productivity, whereas composers' productivity exhibits a negative correlation with offensive, lost or colonial (especially after the conflict ends) inter-state wars, or civil wars. The results seem to indicate that indeed some types of war have

²¹ Note that we do not have any observations for composers aged below 32, who lived abroad in a country engaged in a defensive war.

²² We have also found similar results after we excluded best 5%, best 20%, best 5% and worst 5%, best 10% and worst 10%.

had a positive impact on high-profile creativity.

A possible criticism of our approach is that the involvement of a composer's country of residence in a war does not mean that he must have witnessed the conflict. Nevertheless, we believe that direct experience of a war is not the only channel through which a creative individual might get affected. The impact might work for example through a change in a nation's wealth due to a war, leading to a decrease in demand. Consider offensive or colonial wars – presumably the most expensive types of wars – and the corresponding lower artistic output during or immediately after those wars. Less expensive but probably more disruptive are intra-state wars during which we also observed marked drops in creative productivity. Possibly the change in society's cognition of security during such wars might have impacted both creative production as well as demand for artistic goods. Moreover, one further source of disorganization during civil wars might be the ambiguity of the enemy. But also social aspects must have played a role. The higher artistic productivity associated with victorious wars might correspond with some type of the individual's joy or during defensive wars patriotic motives might have been a further driver for artistic creativity.

While we have not addressed the question of the relationship between wars and the number of great composers, we argue that our results implicitly provide some indication with regard to the emergence of prominent composers. Let us first recollect that the creative output analyzed consists of the most influential works of each composer. It is because of these masterpieces that the composers encompassed by this study are regarded nowadays as the most important. In this sense, war that was demonstrated to have an impact on the number of significant compositions had an indirect influence on the emergence of great composers.

A further question that arises concerns the universality of our findings. We believe that our findings have a more general nature and could apply also to other fields of creative production. Consider, for example, Pablo Picasso who is discussed in Galenson and Weinberg (2001) as an artist who peaked early. A number of Picasso's artworks are inspired by war or deal with the topic of war. Presumably the most famous painting of all ("Guernica"), was depicted only a few days after the German bombing of the Basque town during the Spanish Civil War. Several other examples could be named from an extensive series of Picasso's paintings that reflect the overall sombre mood before, during and after the Second World War.²³ Examples can

²³ E.g. *Death's Head*, 1943, *Skull, Sea Urchins and Lamp on a Table*, 1946, *Massacre in Korea*, 1951.

be also found in literature. Thomas Mann's "The Magic Mountain" - one of the most influential works of 20th century literature - is a literary masterpiece that was written before and during World War I; it describes the European bourgeois society in the difficult decade before the First World War.

This study provides important insights on the relationship between war and composers' (or more in general - creative individuals') productivity. The most important contribution of this work is the demonstration of a highly heterogeneous impact of conflict on composer's productivity. Overall, the evidence presented indicates that the external environment of a composer may be an indispensable determinant of his productivity. The exogenous conditions - presence of peace or the incidence of war - could have a significant impact on the achievements of creative individuals and hence perhaps have considerably shaped the evolution of the classical music canon.

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Tables

TABLE 1
DESCRIPTIVE STATISTICS: COMPOSERS' SUMMARY (n=115)

	Mean (1)	Standard Deviation (2)
A. General characteristics		
Life-span (years)	68.42	14.50
Duration of Career (years)	45.68	14.29
B. Birth country		
British Isles	0.087	0.283
France	0.217	0.414
Germanic Countries	0.191	0.395
Italy	0.096	0.295
Russia	0.139	0.348
Spain	0.026	0.16
Eastern Europe	0.096	0.295
Rest of Europe	0.043	0.205
USA	0.087	0.283
Rest of World	0.017	0.131
C. Birth period		
Born 1800-1849	0.339	0.475
Born 1850-1899	0.583	0.495
Born 1900-1949	0.078	0.270
D. Total works per annum		
Concert	0.420	0.420
Chamber	0.168	0.168
Theater	0.126	0.126
Church	0.016	0.016
Output (= Concert + Chamber + Church + Theater)	0.731	0.731
E. Relative works per annum		
Concert	0.566	0.455
Chamber	0.205	0.363
Theater	0.205	0.380
Church	0.023	0.138
Output (= Concert + Chamber + Church + Theater)	1.0	-
F. Wars experienced		
Intra-state wars (years)	1.13	2.25
Inter-state wars (years)	8.25	5.85
Defensive inter-state wars (years)	4.86	4.18
Offensive inter-state wars (years)	3.39	3.47
Lost inter-state wars (years)	2.53	3.27
Not lost inter-state wars (years)	5.77	4.72
Continental wars (years)	2.44	3.26
Colonial wars (years)	5.81	6.12

SOURCES: Data on composers are obtained from Grove Music Online (2009). Number of important compositions is taken from Gilder and Port (1978). War data is employed from the Correlates of War data set (Sarkees 2000).

NOTE: The *British Isles* include composers from England, Scotland, Ireland and Wales. *Eastern Europe* relates to composers born in any of the Eastern Europe countries as classified by United Nations Statistical Division, with the exclusion of Russia. The *Germanic Countries* relate to the three German-speaking countries of Germany, Austria and Switzerland. *Rest of Europe* covers composers from all other European countries. *World* relates to composers that do not fit in any of the other categories.

TABLE 2
DESCRIPTIVE STATISTICS: COMPOSERS' PRODUCTIVITY AND WARS

	Observations (1)	Total compositions per annum (2)	Difference: wartime - lifetime (3)
Lifetime	5253	0.731 (1.078)	-
Intra-state wars	130	0.461 (0.845)	-0.269* (0.095)
Inter-state wars	949	0.719 (1.059)	-0.012 (0.038)
Defensive inter-state wars	559	0.817 (1.137)	0.086* (0.048)
Offensive inter-state wars	390	0.577 (0.920)	-0.154* (0.056)
Lost inter-state wars	291	0.474 (0.848)	-0.257* (0.064)
Not lost inter-state wars	658	0.827 (1.124)	0.095* (0.044)
Continental wars	281	0.783 (1.124)	0.052 (0.066)
Colonial wars	668	0.692 (1.030)	-0.039 (0.044)

SOURCES: See Table 1.

NOTE: Standard deviations are reported in parentheses. * indicates estimates significantly different from zero at 95 percent confidence.

TABLE 3

COMPOSERS' LIFETIME PRODUCTIVITY DURING INTRA- AND INTER-STATE WARS

Dependent Variable: $COMPOSITIONS_{ij}$

EXPLANATORY VARIABLE	ORDINARY LEAST SQUARES		
	(1)	(2)	(3)
peace * age	0.225 (0.0468)	0.264 (0.0484)	0.295 (0.0489)
peace * age ²	-0.00611 (0.00154)	-0.00732 (0.00157)	-0.00822 (0.00159)
peace * age ³	6.72e-05 (2.11e-05)	8.01e-05 (2.17e-05)	9.12e-05 (2.19e-05)
peace * age ⁴	-2.69e-07 (1.03e-07)	-3.08e-07 (1.06e-07)	-3.57e-07 (1.07e-07)
intra-state war * age	-0.0535 (0.0481)	-0.0552 (0.0498)	-0.0538 (0.0501)
intra-state war * age ²	0.00306 (0.00307)	0.00305 (0.00317)	0.00288 (0.00319)
intra-state war * age ³	-5.99e-05 (6.11e-05)	-5.77e-05 (6.30e-05)	-5.30e-05 (6.32e-05)
intra-state war * age ⁴	3.80e-07 (3.83e-07)	3.53e-07 (3.93e-07)	3.18e-07 (3.94e-07)
inter-state war * age	0.00160 (0.0200)	0.00791 (0.0207)	0.00752 (0.0207)
inter-state war * age ²	-0.000140 (0.00113)	-0.000708 (0.00115)	-0.000707 (0.00116)
inter-state war * age ³	2.70e-06 (2.03e-05)	1.48e-05 (2.07e-05)	1.47e-05 (2.08e-05)
inter-state war * age ⁴	-1.37e-08 (1.17e-07)	-9.17e-08 (1.19e-07)	-8.98e-08 (1.19e-07)
Composer controls	yes	yes	yes
Year controls		yes	yes
Country controls		yes	yes
Location controls			yes
Observations	5253	5253	5253
R-squared	0.502	0.525	0.535

NOTE: Standard errors are in parentheses.

TABLE 4. COMPOSERS' LIFETIME PRODUCTIVITY DURING VARIOUS TYPES OF INTER-STATE WARS

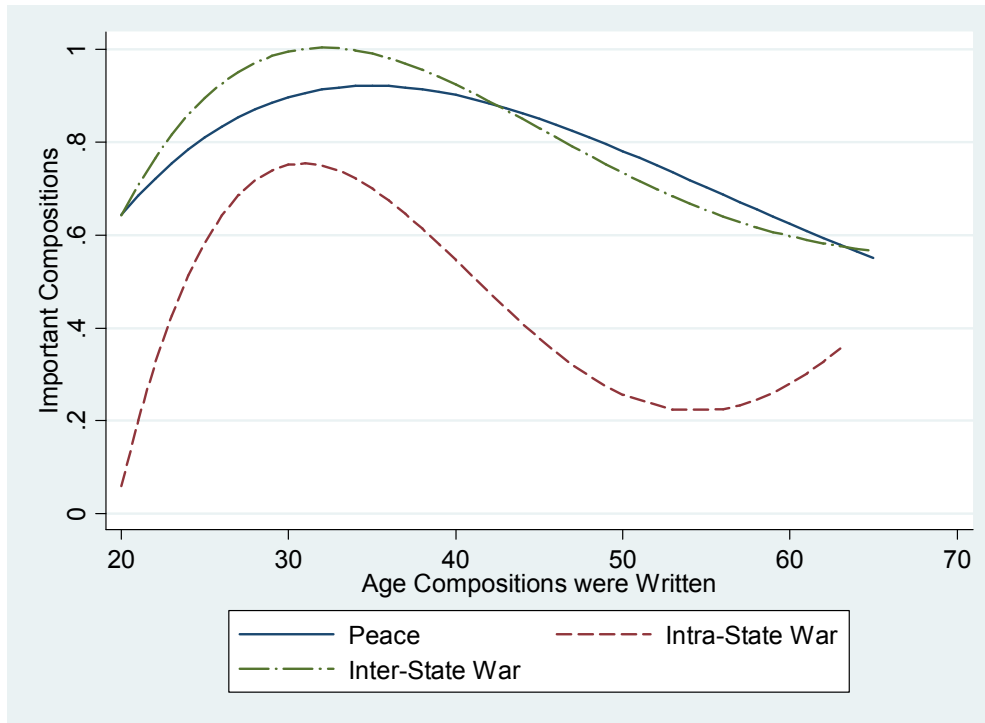
Dependent Variable: $COMPOSITIONS_{ij}$

SORTING CRITERIUM:	BY INITIATION (OLS)			BY OUTCOME (OLS)			BY GEOGRAPHIC EXTENT (OLS)		
	war(A): Defensive inter-state wars war(B): Offensive inter-state wars	(2)	(3)	war(A): Lost inter-state wars war(B): Not lost inter-state wars	(4)	(5)	war(A): Continental inter-state wars war(B): Colonial inter-state wars	(7)	(8)
EXPLANATORY VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
peace * age	0.241 (0.0466)	0.278 (0.0480)	0.308 (0.0484)	0.238 (0.0462)	0.278 (0.0476)	0.309 (0.0481)	0.235 (0.0470)	0.276 (0.0485)	0.304 (0.0489)
peace * age ²	-0.00660 (0.00153)	-0.00770 (0.00157)	-0.00856 (0.00158)	-0.00650 (0.00152)	-0.00769 (0.00156)	-0.00858 (0.00157)	-0.00639 (0.00154)	-0.00764 (0.00158)	-0.00843 (0.00160)
peace * age ³	7.33e-05 (2.11e-05)	8.47e-05 (2.16e-05)	9.54e-05 (2.18e-05)	7.22e-05 (2.09e-05)	8.47e-05 (2.15e-05)	9.58e-05 (2.17e-05)	7.07e-05 (2.12e-05)	8.41e-05 (2.18e-05)	9.38e-05 (2.20e-05)
peace * age ⁴	-2.96e-07 (1.03e-07)	-3.29e-07 (1.06e-07)	-3.76e-07 (1.07e-07)	-2.91e-07 (1.02e-07)	-3.30e-07 (1.05e-07)	-3.79e-07 (1.06e-07)	-2.84e-07 (1.04e-07)	-3.26e-07 (1.06e-07)	-3.69e-07 (1.07e-07)
war(A) * age	-0.00239 (0.0244)	0.00307 (0.0255)	0.00177 (0.0255)	-0.0158 (0.0340)	-0.00934 (0.0344)	-0.0157 (0.0345)	0.00946 (0.0421)	0.00983 (0.0430)	-0.00890 (0.0433)
war(A) * age ²	0.000502 (0.00135)	-7.32e-05 (0.00138)	-6.21e-05 (0.00139)	0.000245 (0.00198)	-0.000191 (0.00200)	9.62e-05 (0.00201)	-0.000464 (0.00251)	-0.000807 (0.00254)	0.000190 (0.00256)
war(A) * age ³	-1.41e-05 (2.39e-05)	-1.42e-06 (2.44e-05)	-1.29e-06 (2.44e-05)	4.42e-06 (3.65e-05)	1.29e-05 (3.68e-05)	8.32e-06 (3.70e-05)	8.08e-06 (4.76e-05)	1.77e-05 (4.81e-05)	4.61e-07 (4.83e-05)
war(A) * age ⁴	1.06e-07 (1.36e-07)	2.33e-08 (1.38e-07)	2.23e-08 (1.38e-07)	-6.83e-08 (2.14e-07)	-1.23e-07 (2.16e-07)	-9.74e-08 (2.17e-07)	-4.71e-08 (2.88e-07)	-1.20e-07 (2.91e-07)	-2.51e-08 (2.92e-07)
war(B) * age	0.0340 (0.0321)	0.0398 (0.0327)	0.0399 (0.0327)	0.0195 (0.0236)	0.0253 (0.0244)	0.0284 (0.0244)	-0.00280 (0.0227)	0.00840 (0.0233)	0.0150 (0.0234)
war(B) * age ²	-0.00268 (0.00187)	-0.00312 (0.00190)	-0.00311 (0.00190)	-0.000943 (0.00132)	-0.00149 (0.00135)	-0.00166 (0.00135)	4.06e-06 (0.00127)	-0.000802 (0.00129)	-0.00118 (0.00130)
war(B) * age ³	5.79e-05 (3.45e-05)	6.72e-05 (3.49e-05)	6.67e-05 (3.50e-05)	1.38e-05 (2.35e-05)	2.57e-05 (2.39e-05)	2.82e-05 (2.39e-05)	1.00e-06 (2.26e-05)	1.69e-05 (2.30e-05)	2.30e-05 (2.31e-05)
war(B) * age ⁴	-3.75e-07 (2.02e-07)	-4.36e-07 (2.05e-07)	-4.30e-07 (2.05e-07)	-5.71e-08 (1.34e-07)	-1.34e-07 (1.36e-07)	-1.45e-07 (1.36e-07)	-6.02e-09 (1.29e-07)	-1.03e-07 (1.31e-07)	-1.34e-07 (1.31e-07)
Composer controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year controls		yes	yes		yes	yes		yes	yes
Country controls		yes	yes		yes	yes		yes	yes
Location controls			yes		yes	yes		yes	yes
Observations	5253	5253	5253	5253	5253	5253	5253	5253	5253
R-squared	0.503	0.526	0.535	0.503	0.525	0.535	0.502	0.525	0.535

NOTE: Standard errors are in parentheses.

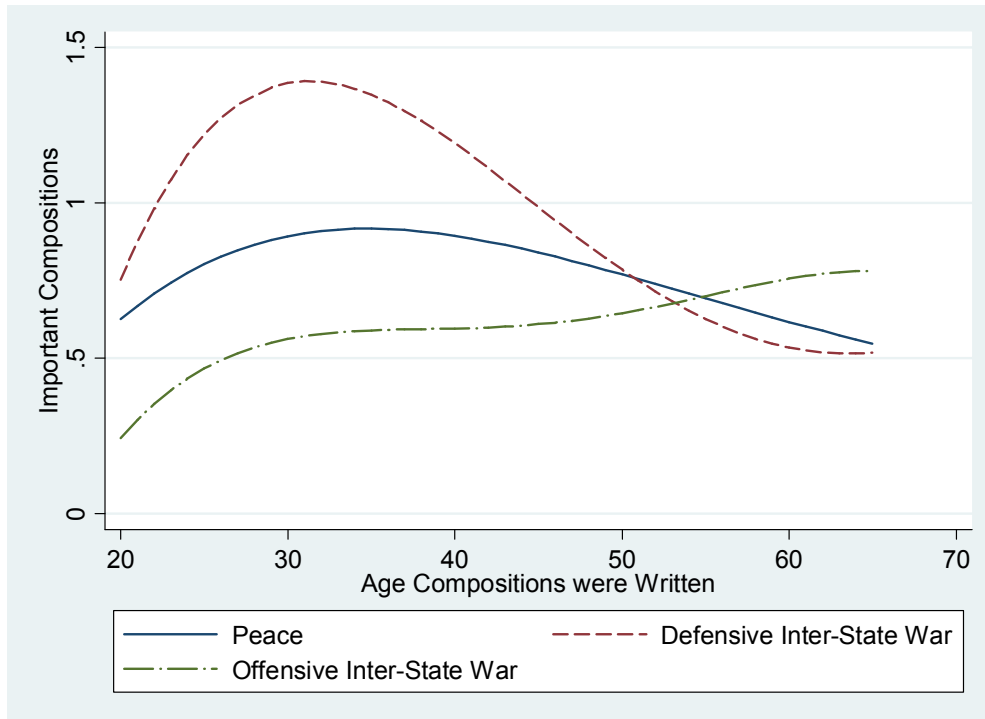
Figures

FIGURE 1. Age-Productivity Profiles: Intra- and Inter-State Wars.



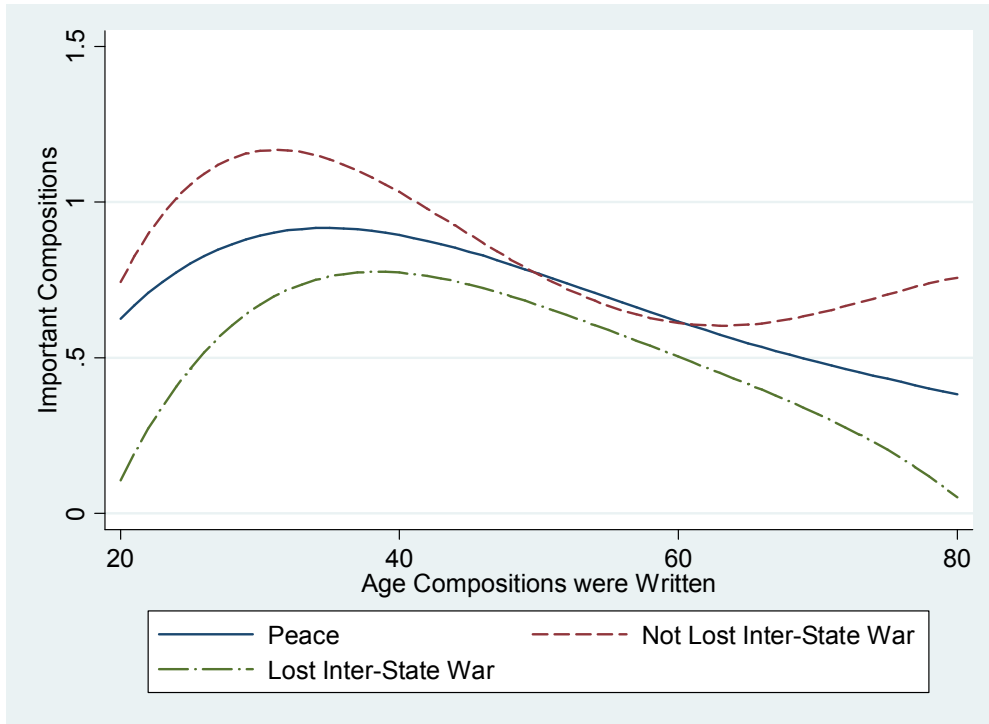
NOTE: Important compositions are calculated from a quartic in age when the composition was written interacted with incidence of war controlling for composer fixed effects. Estimates are based on regression results in Column 1, Table 3.

FIGURE 2. Age-Productivity Profiles: By Initiation of Inter-State Wars.



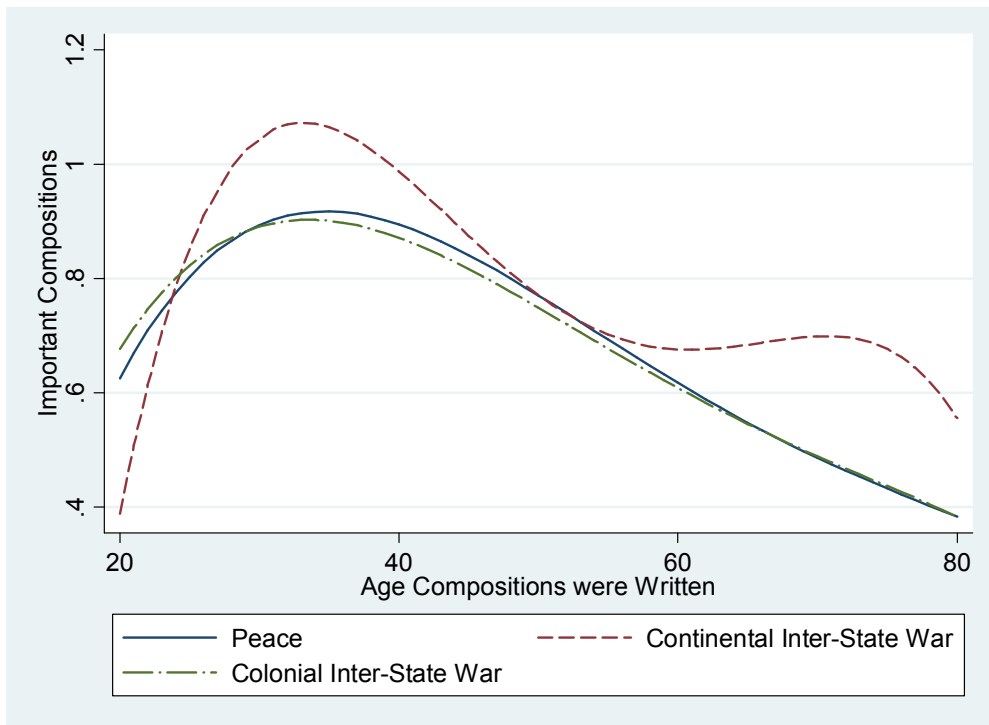
NOTE: Important compositions are calculated from a quartic in age when the composition was written interacted with incidence of war controlling for composer fixed effects. Estimates are based on regression results in Column 1, Table 4.

FIGURE 3. Age-Productivity Profiles: By Outcome of Inter-State Wars.



NOTE: Important compositions are calculated from a quartic in age when the composition was written interacted with incidence of war controlling for composer fixed effects. Estimates are based on regression results in Column 4, Table 4.

FIGURE 4. Age-Productivity Profiles: By Geographic Extent Inter-State Wars.



NOTE: Important compositions are calculated from a quartic in age when the composition was written interacted with incidence of war controlling for composer fixed effects. Estimates are based on regression results in Column 7, Table 4.

Appendix

APPENDIX 1

COMPOSERS INCLUDED IN THIS STUDY

Name	Year of Birth	Year of Death	Country of Birth	Primary work destination	Total works during lifetime	Intra-state wars (in years)	Inter-state wars (in years)
Adam, Adolphe	1803	1856	France	Paris	8	3	4
Albeniz, Isaac	1860	1909	Spain	Barcelona	6	1	1
Arensky, Anton Stepanovich	1861	1906	Russia	Moscow	3	0	1
Balakirev, Mily Alekseyevich	1836	1910	Russia	St Petersburg	14	4	7
Barber, Samuel	1910	1981	USA	New York	25	0	18
Bartok, Bela	1881	1945	Hungary	Budapest	42	2	6
Bax, Sir Arnold	1883	1953	England	London	86	0	16
Bellini, Vincenzo	1801	1835	Italy	Milan	9	0	0
Berg, Alban	1885	1935	Austria	Vienna	14	1	2
Berlioz, Hector	1803	1869	France	Paris	26	3	11
Bizet, Georges	1838	1875	France	Paris	20	1	12
Bliss, Sir Arthur	1891	1975	England	London	65	0	10
Bloch, Ernest	1880	1959	Switzerland	San Francisco	46	0	10
Borodin, Aleksandr	1833	1887	Russia	St Petersburg	10	2	2
Brahms, Johannes	1833	1897	Germany	Vienna	99	0	2
Bruch, Max	1838	1920	Germany	Berlin	17	0	10
Bruckner, Anton	1824	1896	Austria	Vienna	24	0	4
Busoni, Ferruccio	1866	1924	Italy	Berlin	25	0	1
Casella, Alfredo	1883	1947	Italy	Rome	43	0	13
Chabrier, Emmanuel	1841	1894	France	Paris	10	1	12
Charpentier, Gustave	1860	1956	France	Paris	7	0	19
Chausson, Ernest	1855	1899	France	Paris	17	0	3
Chavez, Carlos	1899	1978	Mexico	Mexico City	41	4	2
Chopin, Fryderyk Franciszek	1810	1849	Poland	Paris	48	0	0
Copland, Aaron	1900	1990	USA	New York	39	0	16
Cui, Cesar	1835	1918	Russia	St Petersburg	18	7	10
Dallapiccola, Luigi	1904	1975	Croatia	Florence	26	0	7
Dargomizhsky, Aleksandr Sergeyeovich	1813	1869	Russia	St Petersburg	4	9	4
Debussy, Claude	1862	1918	France	Paris	80	0	6
Delibes, Leo	1836	1891	France	Paris	5	1	14
Delius, Frederick	1862	1934	England	Paris	29	0	9
Dohnanyi, Ernst von	1877	1960	Hungary	Budapest	22	0	12
Dukas, Paul	1865	1935	France	Paris	17	0	10
Dvorak, Antonin	1841	1904	Czech	Prague	88	0	0
Elgar, Edward	1857	1934	England	London	48	0	6
Enesco, Georges	1881	1955	Romania	Paris	16	0	12
Falla, Manuel de	1876	1946	Spain	Grenada	14	5	1
Faure, Gabriel	1845	1924	France	Paris	56	1	16
Flotow, Friedrich Freiherr von	1812	1883	Germany	Paris	1	1	4
Franck, Cesar	1822	1890	France	Paris	29	3	15
Gade, Niels Wilhelm	1817	1890	Denmark	Copenhagen	27	0	2

Gerhard, Roberto	1896	1970	Spain	Cambridge	27	4	11
Gershwin, George	1898	1937	USA	New York	7	0	2
Glazunov, Aleksandr Konstantinovich	1865	1936	Russia	St Petersburg	41	8	9
Glier, Reingol'd Moritsevich	1875	1956	Russia	Moscow	20	12	19
Glinka, Mikhail Ivanovich	1804	1857	Russia	St Petersburg	12	11	5
Gounod, Charles-Francois	1818	1893	France	Paris	21	2	12
Grieg, Edvard Hagerup	1843	1907	Norway	Bergen	21	0	0
Harris, Roy	1898	1979	USA	Stockton	56	0	18
Hindemith, Paul	1895	1963	Germany	Blonay	60	0	12
Holst, Gustav	1874	1934	England	London	69	0	6
Honegger, Arthur	1892	1955	France	Paris	41	0	14
Humperdinck, Engelbert	1854	1921	Germany	Berlin	9	0	5
Ibert, Jacques	1890	1962	France	Paris	21	0	12
Indy, Vincent d'	1851	1931	France	Paris	41	0	12
Ives, Charles Edward	1874	1954	USA	New York	29	0	12
Janacek, Leos	1854	1928	Czech	Brno	21	0	1
Kabalevsky, Dmitry Borosovich	1904	1987	Russia	Moscow	42	4	9
Kodaly, Zoltan	1882	1967	Hungary	Budapest	28	2	7
Lalo, Edouard	1823	1892	France	Paris	13	3	15
Leoncavallo, Ruggero	1857	1919	Italy	Milan	4	0	8
Liszt, Franz	1811	1886	Hungary	Weimar	25	0	6
MacDowell, Edward	1860	1908	USA	New York	26	0	1
Mahler, Gustav	1860	1911	Austria	Vienna	18	0	0
Malipiero, Gian Francesco	1882	1973	Italy	Venice	60	0	14
Martin, Frank	1890	1974	Switzerland	Amsterdam	50	0	0
Martinu, Bohuslav	1890	1959	Czech	Paris	50	0	9
Mascagni, Pietro	1863	1945	Italy	Rome	19	0	14
Massenet, Jules Emile Frederic	1842	1912	France	Paris	29	1	8
Mendelssohn, Felix	1809	1847	Germany	Berlin	65	0	0
Messiaen, Olivier	1908	1992	France	Paris	28	0	8
Milhaud, Darius	1892	1974	France	Paris	73	0	13
Musorgsky, Modeste Petrovich	1839	1881	Russia	St Petersburg	18	0	2
Nicolai, Otto	1810	1849	Germany	Vienna	7	0	2
Nielsen, Carl	1865	1931	Denmark	Copenhagen	29	0	0
Offenbach, Jacques	1819	1880	Germany	Paris	8	4	13
Orff, Carl	1895	1982	Germany	Munich	21	0	10
Piston, Walter	1894	1976	USA	Boston	60	0	18
Pizzetti, Ildebrando	1880	1968	Italy	Rome	23	0	14
Poulenc, Francis	1899	1963	France	Paris	97	0	14
Prokofiev, Sergey	1891	1953	Russia	St Petersburg	75	3	16
Puccini, Giacomo	1858	1924	Italy	Torre de Lago	10	0	6
Rachmaninoff, Serge	1873	1943	Russia	Moscow	36	1	5
Ravel, Maurice	1875	1937	France	Paris	35	0	9
Reger, Max	1873	1916	Germany	Leipzig	48	1	3
Respighi, Ottorino	1879	1936	Italy	Rome	46	0	8
Rimsky-Korsakov, Nikolay Andreyevich	1844	1908	Russia	St Petersburg	35	3	5
Roussel, Albert	1869	1937	France	Varengville	23	0	4
Saint-Saens, Camille	1835	1920	France	Paris	40	1	20
Satie, Erik	1866	1925	France	Paris	46	0	10
Schoenberg, Arnold	1874	1951	Austria-Hungary	Vienna	29	0	12

Schuman, William	1910	1992	USA	Leipzig	41	0	19
Schumann, Robert	1810	1856	Germany	Leipzig	45	0	2
Sessions, Roger	1896	1985	USA	Princeton	29	0	20
Shostakovich, Dmitry	1906	1975	Russia	St Petersburg	131	7	13
Sibelius, Jean	1865	1957	Finland	Helsinki	44	1	6
Smetana, Bedrich	1824	1884	Czech	Prague	21	0	0
Stanford, Sir Charles Villiers	1852	1924	Britain	London	28	0	7
Strauss, Johann (Jr.)	1825	1899	Austria	Vienna	8	2	4
Strauss, Richard	1864	1949	Germany	Vienna	38	1	8
Stravinsky, Igor	1882	1971	Russia	Los Angeles	66	2	20
Sullivan, Sir Arthur	1842	1900	England	London	35	0	3
Szymanowski, Karol	1882	1937	Poland	Warsaw	13	2	3
Tchaikovsky, Pyotr Il'yich	1840	1893	Russia	Moscow	21	0	0
Thomas, Ambroise	1811	1896	France	Paris	26	3	16
Thomson, Virgil	1896	1989	USA	New York	41	0	19
Tippett, Sir Michael	1905	1988	England	London	39	0	14
Vaughan Williams, Ralph	1872	1958	England	London	82	0	14
Verdi, Giuseppe	1813	1901	Italy	Milan	28	2	9
Villa-Lobos, Heitor	1887	1959	Brazil	Rio de Janeiro	80	1	6
Wagner, Richard	1813	1883	Germany	Zurich	13	0	5
Walton, Sir William	1902	1983	England	Ischia	24	0	0
Webern, Anton	1883	1945	Austria	Vienna	28	0	11
Wolf, Hugo	1860	1903	Austria	Vienna	11	0	0
Wolf-Ferrari, Ermanno	1876	1948	Italy	Venice	13	0	7

SOURCE: Data on composers are obtained from Grove Music Online (2009). Number of important compositions is taken from Gilder and Port (1978). War data is employed from the Correlates of War data set (Sarkees 2000).

APPENDIX 1
ROBUSTNESS ANALYSIS

Table A1. Categories of classical works.

Category	Types of classical works	Observations
Concert	Symphony, overture, march, or other concert form	2208
Chamber	Sonata, quartet, art song, or other chamber form	885
Theater	Ballet, opera, or other theater form	664
Church	Mass, church cantata, or other religious form	84

Table A3. Composers' emigration intensity.

	Mean	Observations
Composers that have worked abroad	0.773	115
Work related time spent abroad	0.233	5253
Work related time spent abroad in time of war	0.037	5253

Figure A1.1. Age-Productivity Profiles: Intra- and Inter-state wars by type of work.

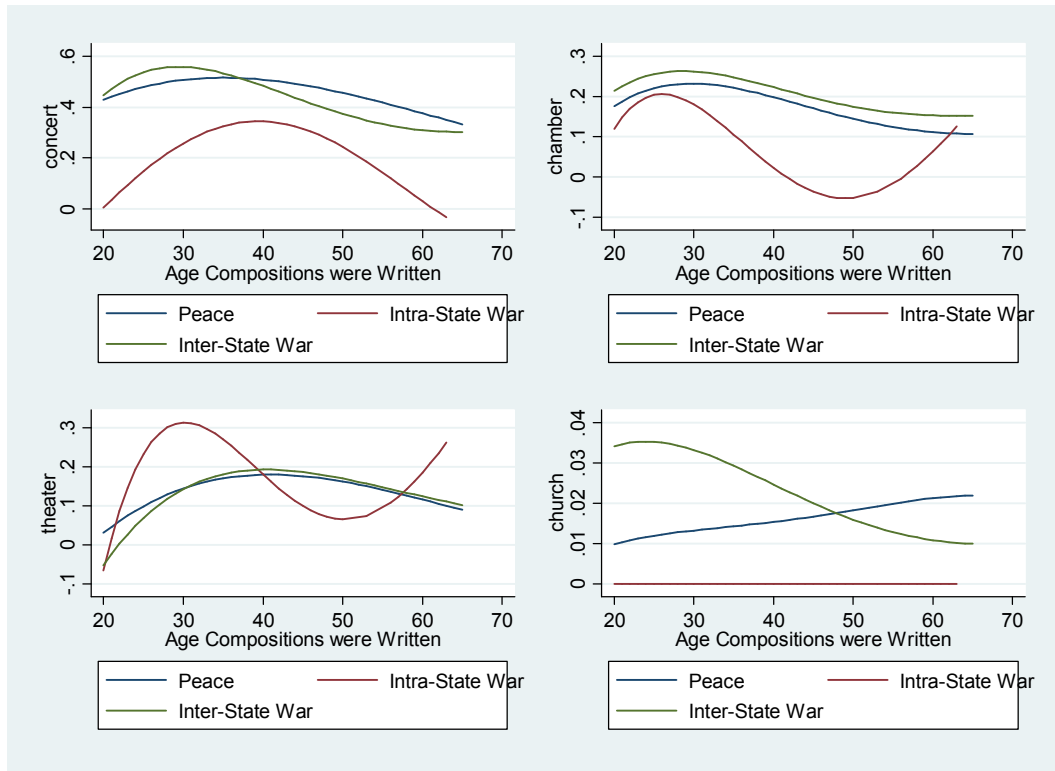


Figure A1.2. Age-Productivity Profiles: By initiation and type of work.

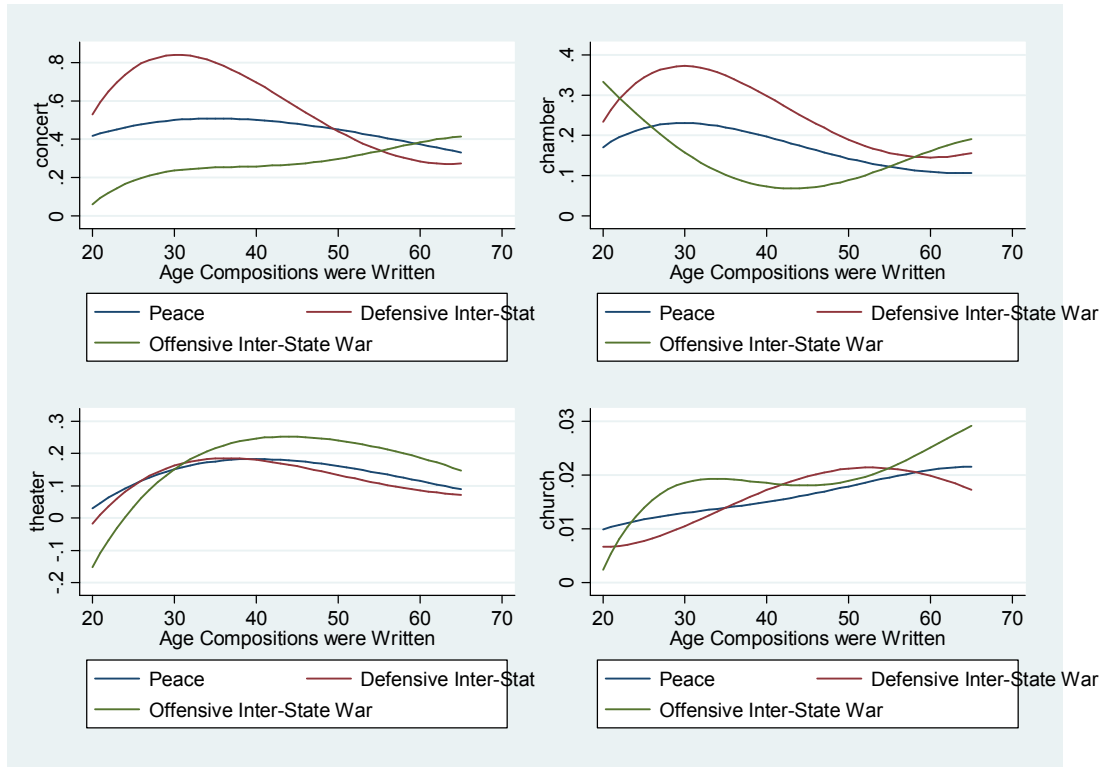


Figure A1.3. Age-Productivity Profiles: By outcome and type of work.

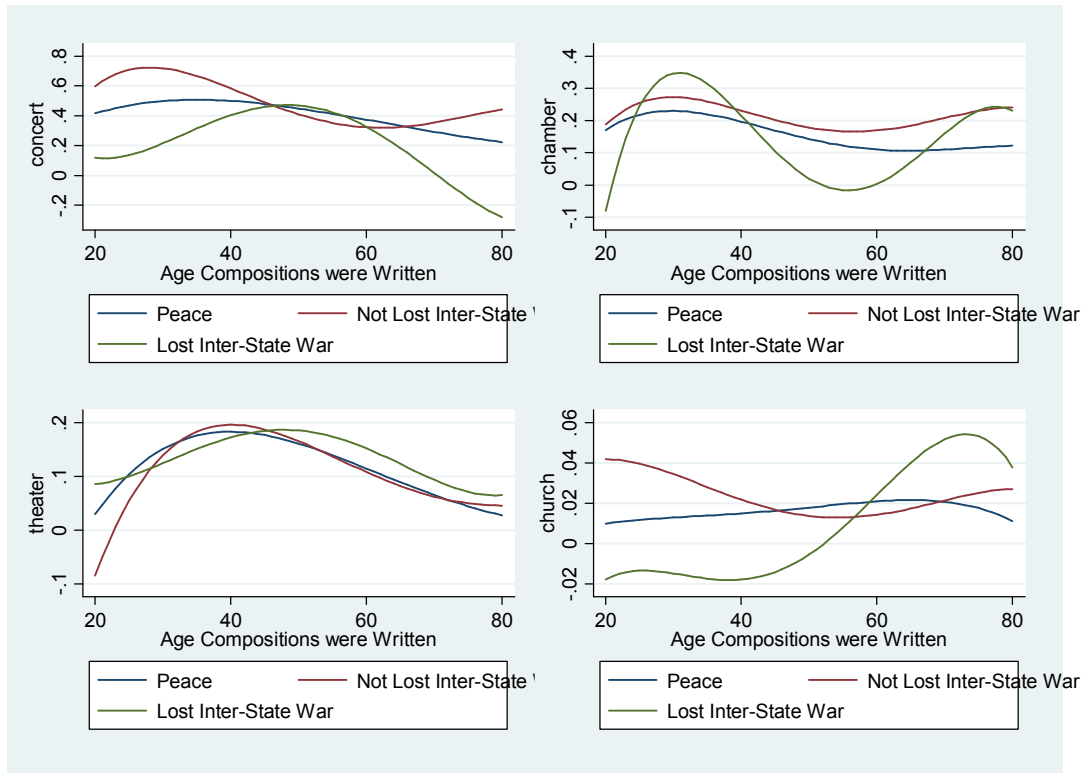


Figure A1.4. Age-Productivity Profiles: By geographic extent and type of work.

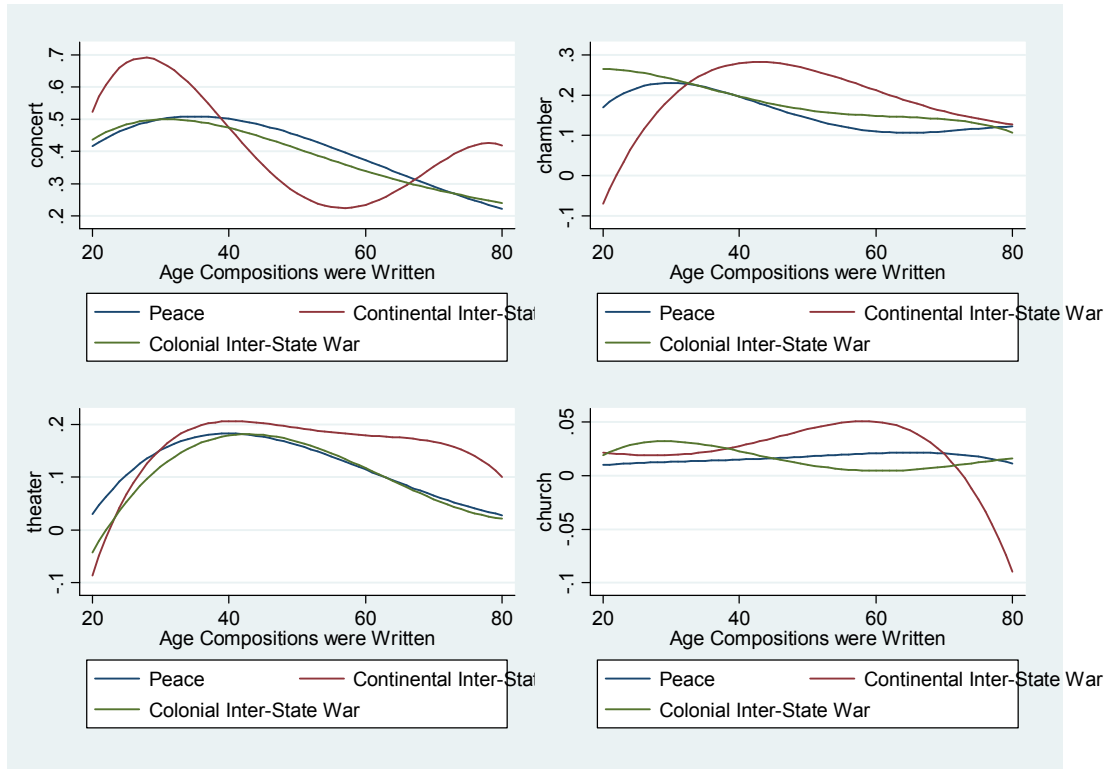


Figure A2.1. Age-productivity profiles 2 years after war.

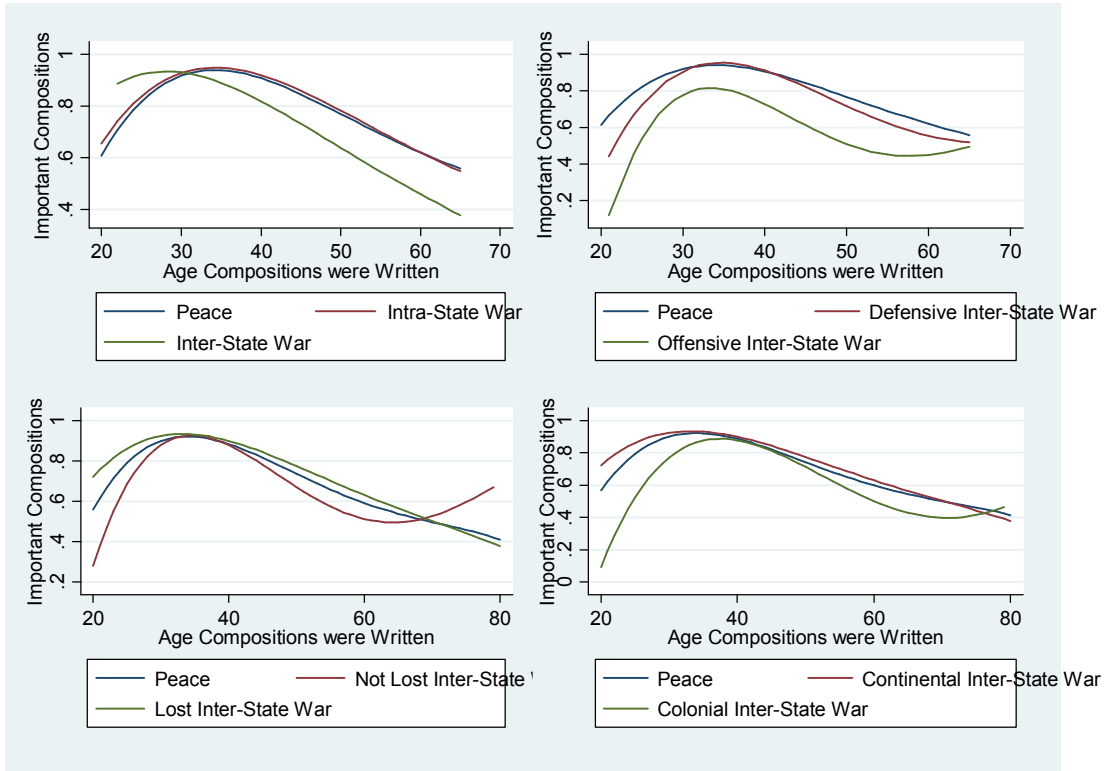


Figure A3.1 Composers' productivity in home country and abroad.

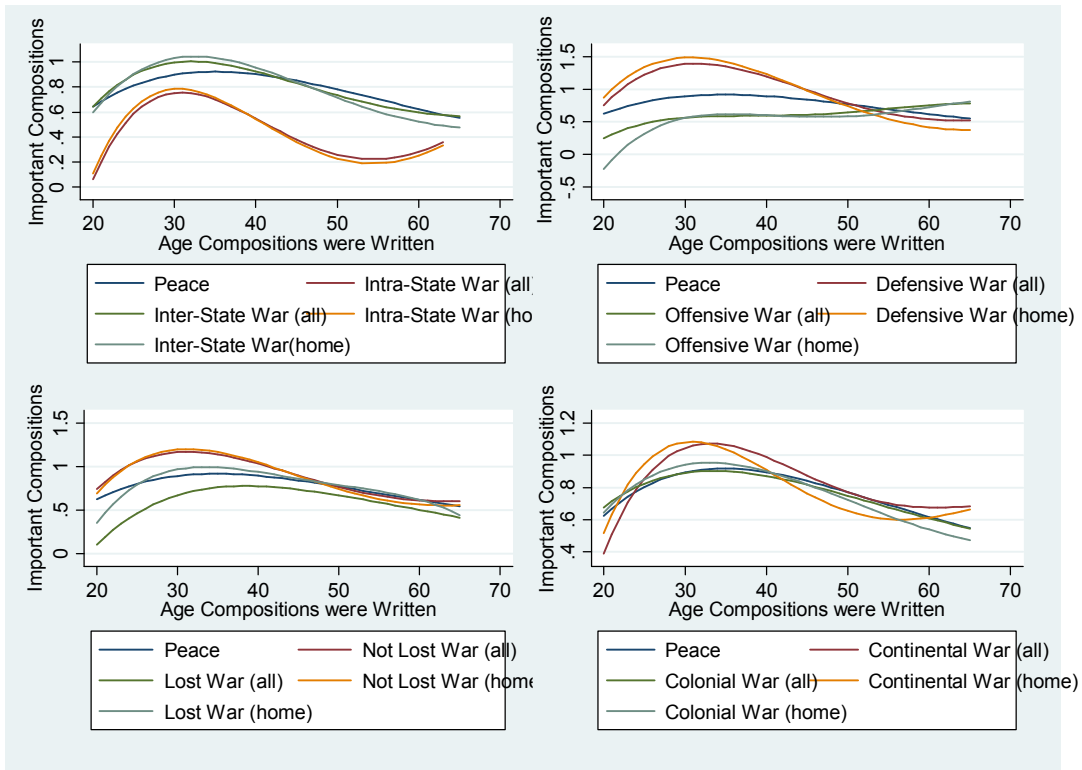


Figure A3.2 Composers' productivity during defensive wars (home country and abroad).

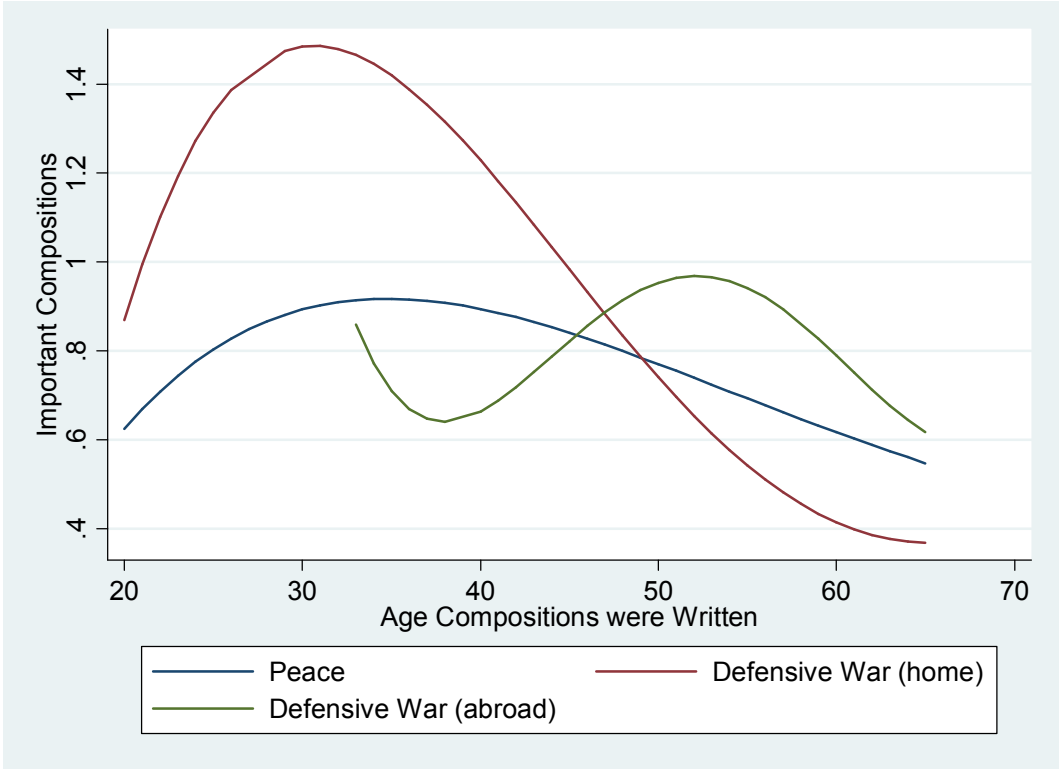


Figure A4. Dropping extreme decile.

